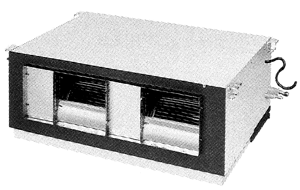
Si42-107

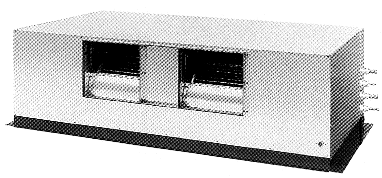
Service Manual

Packaged Air Conditioners Duct Connection Type

(High Static Pressure Application)

FD(Y)-K(A) Series





[Applied Models]
Cooling Only
Heat Pump

Packaged Air Conditioners Duct Connection Type (High Static Pressure Application) FD(Y)-K Series

1. Introduction

1.1 Safety Cautions

Cautions and Warnings

- Be sure to read the following safety cautions before conducting repair work.
- The caution items are classified into “⚠**Warning**” and “⚠**Caution**”. The ⚠“**Warning**” items are especially important since they can lead to death or serious injury if they are not followed closely. The “⚠**Caution**” items can also lead to serious accidents under some conditions if they are not followed. Therefore, be sure to observe all the safety caution items described below.
- About the pictograms

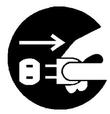
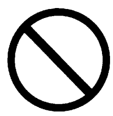
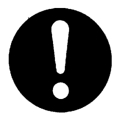
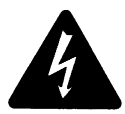
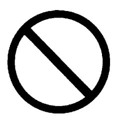
△ This symbol indicates an item for which caution must be exercised.
The pictogram shows the item to which attention must be paid.

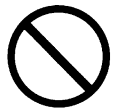
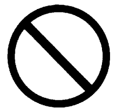
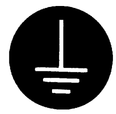
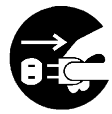
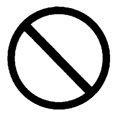
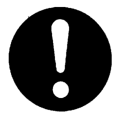
○ This symbol indicates a prohibited action.
The prohibited item or action is shown inside or near the symbol.

● This symbol indicates an action that must be taken, or an instruction.
The instruction is shown inside or near the symbol.

- After the repair work is complete, be sure to conduct a test operation to ensure that the equipment operates normally, and explain the cautions for operating the product to the customer.

1.1.1 Caution in Repair

⚠ Warning	
Be sure to disconnect the power cable plug from the plug socket before disassembling the equipment for a repair. Working on the equipment that is connected to a power supply can cause an electrical shook. If it is necessary to supply power to the equipment to conduct the repair or inspecting the circuits, do not touch any electrically charged sections of the equipment.	
If the refrigerant gas discharges during the repair work, do not touch the discharging refrigerant gas. The refrigerant gas can cause frostbite.	
When disconnecting the suction or discharge pipe of the compressor at the welded section, release the refrigerant gas completely at a well-ventilated place first. If there is a gas remaining inside the compressor, the refrigerant gas or refrigerating machine oil discharges when the pipe is disconnected, and it can cause injury.	
If the refrigerant gas leaks during the repair work, ventilate the area. The refrigerant gas can generate toxic gases when it contacts flames.	
The step-up capacitor supplies high-voltage electricity to the electrical components of the outdoor unit. Be sure to discharge the capacitor completely before conducting repair work. A charged capacitor can cause an electrical shock.	
Do not start or stop the air conditioner operation by plugging or unplugging the power cable plug. Plugging or unplugging the power cable plug to operate the equipment can cause an electrical shock or fire.	

Caution	
Do not repair the electrical components with wet hands. Working on the equipment with wet hands can cause an electrical shock.	
Do not clean the air conditioner by splashing water. Washing the unit with water can cause an electrical shock.	
Be sure to provide the grounding when repairing the equipment in a humid or wet place, to avoid electrical shocks.	
Be sure to turn off the power switch and unplug the power cable when cleaning the equipment. The internal fan rotates at a high speed, and cause injury.	
Do not tilt the unit when removing it. The water inside the unit can spill and wet the furniture and floor.	
Be sure to check that the refrigerating cycle section has cooled down sufficiently before conducting repair work. Working on the unit when the refrigerating cycle section is hot can cause burns.	
Use the welder in a well-ventilated place. Using the welder in an enclosed room can cause oxygen deficiency.	

1.1.2 Cautions Regarding Products after Repair

Warning	
Be sure to use parts listed in the service parts list of the applicable model and appropriate tools to conduct repair work. Never attempt to modify the equipment. The use of inappropriate parts or tools can cause an electrical shock, excessive heat generation or fire.	
When relocating the equipment, make sure that the new installation site has sufficient strength to withstand the weight of the equipment. If the installation site does not have sufficient strength and if the installation work is not conducted securely, the equipment can fall and cause injury.	
Be sure to install the product correctly be using the provided standard installation frame. Incorrect use of the installation frame and improper installation can cause the equipment to fall, resulting in injury.	For integral units only
Be sure to install the product securely in the installation frame mounted on a window frame. If the unit is not securely mounted, it can fall and cause injury.	For integral units only

Warning	
Be sure to use an exclusive power circuit for the equipment, and follow the technical standards related to the electrical equipment, the internal wiring regulations and the instruction manual for installation when conducting electrical work. Insufficient power circuit capacity and improper electrical work can cause an electrical shock on fire.	
Be sure to use the specified cable to connect between the indoor and outdoor units. Make the connections securely and route the cable properly so that there is no force pulling the cable at the connection terminals. Improper connections can cause excessive heat generation or fire.	
When connecting the cable between the indoor and outdoor units, make sure that the terminal cover does not lift off or dismount because of the cable. If the cover is not mounted properly, the terminal connection section can cause an electrical shock, excessive heat generation or fire.	
Do not damage or modify the power cable. Damaged or modified power cable can cause an electrical shock or fire. Placing heavy items on the power cable, and heating or pulling the power cable can damage the cable.	
Do not mix air or gas other than the specified refrigerant (R22) in the refrigerant system. If air enters the refrigerating system, an excessively high pressure results, causing equipment damage and injury.	
If the refrigerant gas leaks, be sure to locate the leak and repair it before charging the refrigerant. After charging refrigerant, make sure that there is no refrigerant leak. If the leak cannot be located and the repair work must be stopped, be sure to perform pump-down and close the service valve, to prevent the refrigerant gas from leaking into the room. The refrigerant gas itself is harmless, but it can generate toxic gases when it contacts flames, such as fan and other heaters, stoves and ranges.	
When replacing the coin battery in the remote controller, be sure to disposed of the old battery to prevent children from swallowing it. If a child swallows the coin battery, see a doctor immediately.	

Caution	
Installation of a leakage breaker is necessary in some cases depending on the conditions of the installation site, to prevent electrical shocks.	
Do not install the equipment in a place where there is a possibility of combustible gas leaks. If a combustible gas leaks and remains around the unit, it can cause a fire.	
Be sure to install the packing and seal on the installation frame properly. If the packing and seal are not installed properly, water can enter the room and wet the furniture and floor.	For integral units only

1.1.3 Inspection after Repair

Warning	
Check to make sure that the power cable plug is not dirty or loose, then insert the plug into a power outlet all the way. If the plug has dust or loose connection, it can cause an electrical shock or fire.	
If the power cable and lead wires have scratches or deteriorated, be sure to replace them. Damaged cable and wires can cause an electrical shock, excessive heat generation or fire.	

Warning	
Do not use a joined power cable or extension cable, or share the same power outlet with other electrical appliances, since it can cause an electrical shock, excessive heat generation or fire.	

Caution	
Check to see if the parts and wires are mounted and connected properly, and if the connections at the soldered or crimped terminals are secure. Improper installation and connections can cause excessive heat generation, fire or an electrical shock.	
If the installation platform or frame has corroded, replace it. Corroded installation platform or frame can cause the unit to fall, resulting in injury.	
Check the grounding, and repair it if the equipment is not properly grounded. Improper grounding can cause an electrical shock.	
Be sure to measure the insulation resistance after the repair, and make sure that the resistance is 1 Mohm or higher. Faulty insulation can cause an electrical shock.	
Be sure to check the drainage of the indoor unit after the repair. Faulty drainage can cause the water to enter the room and wet the furniture and floor.	

1.1.4 Using Icons

Icons are used to attract the attention of the reader to specific information. The meaning of each icon is described in the table below:

1.1.5 Using Icons List

Icon	Type of Information	Description
Note:	Note	A “note” provides information that is not indispensable, but may nevertheless be valuable to the reader, such as tips and tricks.
Caution	Caution	A “caution” is used when there is danger that the reader, through incorrect manipulation, may damage equipment, loose data, get an unexpected result or has to restart (part of) a procedure.
Warning	Warning	A “warning” is used when there is danger of personal injury.
	Reference	A “reference” guides the reader to other places in this binder or in this manual, where he/she will find additional information on a specific topic.

Packaged Air Conditioners Duct Connection Type (High static Pressure Application) FD-K Series — Cooling Only —

Model Series

Class	3HP	4HP	5HP	6HP	8HP	10HP	15HP	20HP
Indoor Units	FD03K	FD04K	FD05K	FD06K	FD08K	FD10K	FD15K	FD20K
Outdoor Units	R71FU	R100FU	R125FU	RU06K	RU08K	RU10K	RU08K×2	RU10K×2

Part 1
Model Name and Power Supply

1. Power Supply

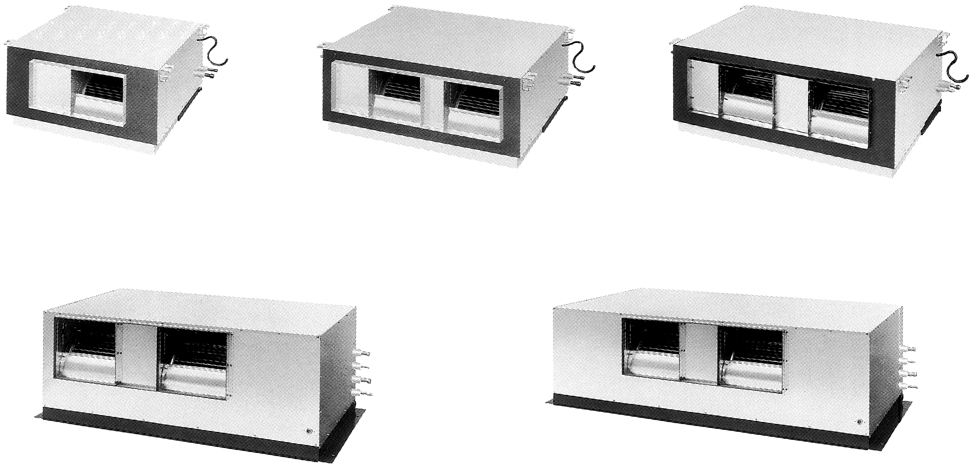
1.1 Power Supply

Symbol	Indoor unit	Outdoor unit	Power supply
Y1	FD03KY1	R71FUY1	3φ 380~415V 50Hz (4 wires)
	FD04KY1	R100FUY1	
	FD05KY1	R125FUY1	
	FD06KY1	RU06KY1	
	FD08KY1	RU08KY1	
	FD10KY1	RU10KY1	
	FD15KY1	RU08KY1×2	
	FD20KY1	RU10KY1×2	
VAL	FD03KVAL	R71FUVAL	1φ 220V 60Hz
	FD04KVAL	R100FUVAL	
TAL	FD05KTAL	R125FUTAL	3φ 220V 60Hz
	FD06KTAL	RU06KTAL	
	FD08KTAL	RU08KTAL	
	FD10KTAL	RU10KTAL	
	FD15KTAL	RU08KTAL×2	
	FD20KTAL	RU10KTAL×2	

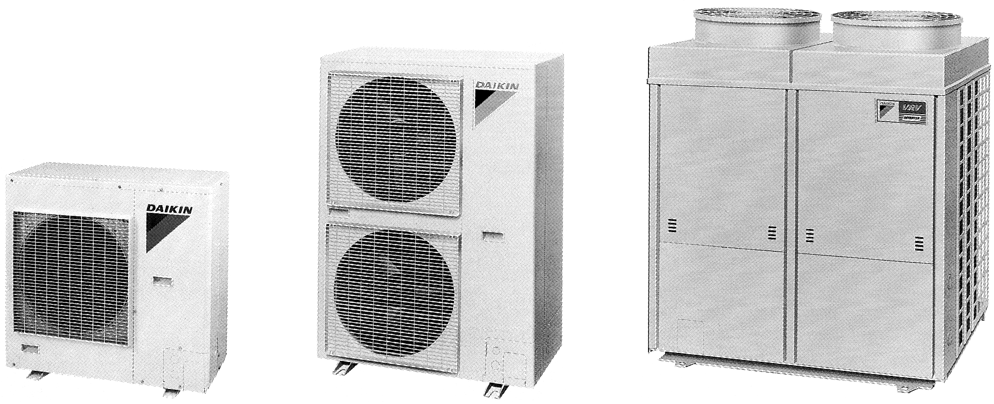
2. External Appearance

2.1 External Appearance

2.1.1 Indoor Units



2.1.2 Outdoor Units



Part 2
Functions

1. Function

1.1 Function

Items	Points and Functions	Duct Connection High Static Pressure Type FD-K
For Easy Operation	Auto Restart	○
For Flexible Operation	Adjustable External Static Pressure	○(Exchange of Motor Pulley)
For Easy Construction and Maintenance	Chargeless Length	5m
	Anti-corrosion treatment of outdoor heat exchanger fins	○
For Flexible Control	Central Control	○(Adaptor Kit is needed)

○: Existing Functions

Part 3
Specifications

1. Specifications

1.1 50Hz

Model			Indoor Units	FD03KY1	FD04KY1	FD05KY1	FD06KY1
			Outdoor Units	R71FUY1	R100FUY1	R125FUY1	RU06KY1
★1 Cooling Capacity			kW	8.1	11.0	14.0	17.4
			Btu/h	27,800	37,700	47,600	59,500
			kcal/h	7,000	9,500	12,000	15,000
Capacity Steps			%	100-0	100-0	100-0	100-0
Piping Connections	Indoor Unit	Liquid	mm	ϕ9.5 (Brazing)	ϕ9.5 (Brazing)	ϕ9.5 (Brazing)	ϕ9.5 (Brazing)
		Gas	mm	ϕ15.9 (Brazing)	ϕ19.1 (Brazing)	ϕ19.1 (Brazing)	ϕ19.1 (Brazing)
		Drain	mm	FPS3/4B	FPS3/4B	FPS3/4B	FPS3/4B
	Outdoor Unit	Liquid	mm	ϕ9.5 (Flare)	ϕ9.5 (Flare)	ϕ9.5 (Flare)	ϕ9.5 (Flare)
		Gas	mm	ϕ15.9 (Flare)	ϕ19.1 (Flare)	ϕ19.1 (Flare)	ϕ19.1 (Flare)
		Drain	mm	ϕ26.0 (Hole)	ϕ26.0 (Hole)	ϕ26.0 (Hole)	—
Indoor Units				**FD03KY1**	**FD04KY1**	**FD05KY1**	**FD06KY1**
Coil	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)			
	Row×Stages×Fin Pitch			2×24×2.0	2×24×2.0	2×24×2.0	2×24×2.0
	Face Area		m²	0.238	0.370	0.370	0.491
Fan	Type			Sirocco Fan			
	Drive			Belt Drive			
	Air Flow Rate		m³/min.	26	30	46	52
			cfm	918	1,059	1,620	1,836
	Ext. Static Pressure		mmH_2O	7	9	9	9
	Motor Output		kW	0.4	0.4	0.75	0.75
Dimensions		H×W×D	mm	450×650×850	450×900×850	450×900×850	450×1,130×850
Weight			kg	51	59	72	79
Outdoor Units				**R71FUY1**	**R100FUY1**	**R125FUY1**	**RU06KY1**
Color				Ivory			Ivory white
Compressor	Type			Hermetically Sealed Reciprocating Type			Hermetically Sealed Scroll Type
	Model			H23A35QDBNA	H23A46QDBNA	H23A56QDBNA	JT200B-YE
	No. of Cylinders			2	2	2	—
	Motor Output		kW	3.0	3.8	4.5	4.5
Refrigerant	Model			R22			
	Charge		kg	2.1	2.4	2.8	3.0 (Factory Charge for 5 m)
Refrigerant Oil	Model			SUNISO 3GS			SUNISO 4GSDID-K
	Charge		l	1.48	1.63	1.63	1.6
Coil	Type			Cross Fin Coil			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)
	Rows×Stages×Fin Pitch			2×36×2.0	2×54×2.0	2×54×2.0	2×60×2.0
	Face Area		m²	0.653	0.979	0.979	1.16
Refrigerant Control				Capillary Tube			
Ref. Piping	Standard Length		m	5	5	5	5
	Max. Length		m	50 (Equivalent Length 70m)	50 (Equivalent Length 70m)	50 (Equivalent Length 70m)	50 (Equivalent Length 70m)
	Max. Height Difference		m	30	30	30	30
Fan	Type			Propeller			
	Model			P45J11SM	P45J11SM×2	P45J11SM×2	P45J11SM
	Air Flow Rate 50/60Hz		m³/min	46	80	87	108
			cfm	1,620	2,824	3,071	3,812
	Motor Output		W	50	75+35	75+60	85+65
Safety Devices				Thermal Protector for Outdoor Fan Motor, Internal Pressure Relief Valve. (Compressor) Motor Protector (Compressor) Overcurrent Relay for Indoor Fan Motor.			Thermal Protector for Compressor and Outdoor Fan Motor, High Pressure Switch, Low Pressure Switch, Over Current Relay (Compressor and Indoor Fan Motor), Reverse Phase Protector, Fuse.
Dimensions		H×W×D	mm	816×880×370	1,215×880×370	1,215×880×370	1,345×880×320
Weight			kg	84	109	110	112
Drawing No.				4D004103A			4D006819A

Notes:

★1. Nominal cooling capacities are based on the following conditions:
Return air temperature : 27°CDB, 19.5°CWB, Outdoor temperature : 35°CDB Equivalent ref.piping : 5m (Horizontal)

★2. Capacities are gross capacities which do not include a deduction for evaporator fan motor heat.

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

Model	Indoor Units			FD08KY1	FD10KY1	FD15KY1	FD20KY1
	Outdoor Units			RU08KY1	RU10KY1	RU08KY1×2	RU10KY1×2
★1 Cooling Capacity			kW	24.3	29.7	48.6	59.3
			Btu/h	83,000	101,200	166,000	202,400
			kcal/h	20,900	25,500	41,800	51,000
Capacity Steps			%	100-0	100-0	100-50-0	100-50-0
Piping Connections	Indoor Unit	Liquid	mm	ϕ12.7 (Brazing)	ϕ15.9 (Brazing)	2×ϕ12.7 (Brazing)	2×ϕ15.9 (Brazing)
		Gas	mm	ϕ25.4 (Brazing)	ϕ31.8 (Brazing)	2×ϕ25.4 (Brazing)	2×ϕ31.8 (Brazing)
		Drain	mm	FPS3/4B	FPS3/4B	FPS1B	FPS1B
	Outdoor Unit	Liquid	mm	ϕ12.7 (Brazing)	ϕ15.9 (Brazing)	2×ϕ12.7 (Brazing)	2×ϕ15.9 (Brazing)
		Gas	mm	ϕ25.4 (Brazing)	ϕ31.8 (Brazing)	2×ϕ25.4 (Brazing)	2×ϕ31.8 (Brazing)
		Drain	mm	—	—	—	—
Indoor Units				**FD08KY1**	**FD10KY1**	**FD15KY1**	**FD20KY1**
Coil	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)			
	Row×Stages×Fin Pitch			3×22×2.0	3×22×2.0	3×26×2.0	3×26×2.0
	Face Area		m²	0.443	0.54	0.784	0.99
Fan	Type			Sirocco Fan			
	Drive			Belt Drive			
	Air Flow Rate		m³/min.	68	83	136	166
			cfm	2,400	2,930	4,800	5,860
	Ext. Static Pressure		mmH_2O	10	10	15	15
	Motor Output		kW	1.5	1.5	2.2	3.7
Dimensions		H×W×D	mm	500×1,130×850	500×1,330×850	625×1,620×850	625×1,980×850
Weight			kg	93	104	161	187
Outdoor Units				**RU08KY1**	**RU10KY1**	**RU08KY1×2**	**RU10KY1×2**
Color				Ivory White			
Compressor	Type			Hermetically Sealed Scroll Type			
	Model			JT265DYE-P1	JT335DYE-P1	2×(JT265DYE-P1)	2×(JT335DYE-P1)
	Motor Output		kW	7.5	9	2×7.5	2×9.0
Refrigerant	Model			R22			
	Charge		kg	5.0 (Field Charge for 5 m)	6.1 (Field Charge for 5 m)	2×5.0 (Field Charge for 5m)	2×6.1 (Field Charge for 5m)
Refrigerant Oil	Model			SUNISO 4GSDID-K			
	Charge		l	4	4	2×4.0	2×4.0
Coil	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)			
	Rows×Stages×Fin Pitch			2×40×2.0	2×50×2.0	2×(2×40×2.0)	2×(2×50×2.0)
	Face Area		m²	1.57	1.97	2×1.57	2×1.97
Refrigerant Control				Capillary Tube			
Ref. Piping	Standard Length		m	5	5	5	5
	Max. Length		m	50 (Equivalent Length 70m)	50 (Equivalent Length 70m)	50 (Equivalent Length 70m)	50 (Equivalent Length 70m)
	Max. Height Difference		m	30	30	30	30
Fan	Type			Propeller			
	Model			P52H11S	P52H11S	2TP52H11S	2TP52H11S
	Air Flow Rate 50/60Hz		m³/min	150	175	2×150	2×175
			cfm	5,295	6,177	2×5,295	2×6,177
	Motor Output		W	230+190	230+190	2×(230+190)	2×(230+190)
Safety Devices				Thermal Protector for Compressor and Outdoor Fan Motor, High Pressure Switch, Over Current Relay (Compressor and Indoor Fan Motor), Reverse Phase Protector, Fuse.			
Dimensions		H×W×D	mm	1,220×1,280×690	1,440×1,280×690	2×(1,220×1,280×690)	2×(1,440×1,280×690)
Weight			kg	177	190	2×177	2×190
Drawing No.				4D006819A		4D008677	

Notes:

★1. Nominal cooling capacities are based on the following conditions:
Return air temperature : 27°CDB, 19.5°CWB, Outdoor temperature : 35°CDB Equivalent ref.piping : 5m (Horizontal)

★2. Capacities are gross capacities which do not include a deduction for evaporator fan motor heat.

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

1.2 60Hz

Model				FD03KVAL	FD04KVAL	FD05KTAL	FD06KTAL
Model	Indoor Units			FD03KVAL	FD04KVAL	FD05KTAL	FD06KTAL
	Outdoor Units			R71FUVAL	R100FUVAL	R125FUTAL	RU06KTAL
★1 Cooling Capacity			kW	8.6	12.1	15.5	17.4
			Btu/h	29,400	41,300	52,800	59,500
			kcal/h	7,400	10,400	13,300	15,000
Capacity Steps			%	100-0	100-0	100-0	100-0
Piping Connections	Indoor Unit	Liquid	mm	ϕ9.5 (Brazing)	ϕ9.5 (Brazing)	ϕ9.5 (Brazing)	ϕ9.5 (Brazing)
		Gas	mm	ϕ15.9 (Brazing)	ϕ19.1 (Brazing)	ϕ19.1 (Brazing)	ϕ19.1 (Brazing)
		Drain	mm	FPS3/4B	FPS3/4B	FPS3/4B	FPS3/4B
	Outdoor Unit	Liquid	mm	ϕ9.5 (Flare)	ϕ9.5 (Flare)	ϕ9.5 (Flare)	ϕ9.5 (Flare)
		Gas	mm	ϕ15.9 (Flare)	ϕ19.1 (Flare)	ϕ19.1 (Flare)	ϕ19.1 (Flare)
		Drain	mm	ϕ26.0 (Hole)	ϕ26.0 (Hole)	ϕ26.0 (Hole)	—
Indoor Units				**FD03KVAL**	**FD04KVAL**	**FD05KTAL**	**FD06KTAL**
Coil	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)			
	Row×Stages×Fin Pitch			2×24×2.0	2×24×2.0	2×24×2.0	2×24×2.0
	Face Area		m^2	0.238	0.370	0.370	0.491
Fan	Type			Sirocco Fan			
	Drive			Belt Drive			
	Air Flow Rate		m^3/min.	26	30	46	52
			cfm	917	1,059	1,623	1,835
	Ext. Static Pressure		mmH_2O	7	9	9	9
	Motor Output		kW	0.4	0.4	0.75	0.75
Dimensions	H×W×D		mm	450×650×850	450×900×850	450×900×850	450×1,130×850
Weight			kg	54	62	72	79
Outdoor Units				**R71FUVAL**	**R100FUVAL**	**R125FUTAL**	**RU06KTAL**
Color				Ivory			Ivory White
Compressor	Type			Hermetically Sealed Reciprocating Type			Hermetically Sealed Scroll Type
	Model		VAL	H23A35QABCA	H23A46QABCA	—	—
			TAL	—	—	H23A62QDBLA	JT190B
	No. of Cylinders			2	2	2	—
	Motor Output		kW	3.4	4.5	6.0	4.5
Refrigerant	Model			R22			
	Charge		kg	2.2 (Charged for 5m)	2.9 (Charged for 5m)	3.1 (Charged for 5m)	3.0 (Factory Charge for 5m)
Refrigerant Oil	Model			SUNISO 3GS			SUNISO 4GSDID-K
	Charge		l	1.48	1.63	1.63	1.6
Coil	Type			Cross Fin Coil			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)
	Rows×Stages×Fin Pitch			2×36×2.0	2×54×2.0	2×54×2.0	2×60×2.0
	Face Area		m^2	0.653	0.979	0.979	1.16
Refrigerant Control				Capillary Tube			
Ref. Piping	Standard Length		m	5	5	5	5
	Max. Length		m	50 (Equivalent Length 70m)	50 (Equivalent Length 70m)	50 (Equivalent Length 70m)	50 (Equivalent Length 70m)
	Max. Height Difference		m	30	30	30	30
Fan	Type			Propeller			
	Model			P45J11SM	P45J11SMT2	P45J11SMT2	P45J11SM
	Air Flow Rate 50/60Hz		m^3/min	55	92	98	108
			cfm	1,941	3,247	3,459	3,812
	Motor Output		W	80	90+60	90+80	100+100
Safety Devices				Thermal Protector for Outdoor Fan Motor, Internal Pressure Relief Valve. (Compressor) Motor Protector. (Compressor) Over-Current Relay for Indoor Fan Motor.			Thermal Protector for Compressor and Outdoor Fan Motor, High Pressure Switch, Low Pressure Switch, Over Current Relay (Compressor and Indoor Fan Motor), Reverse Phase Protector, Fuse.
Dimensions	H×W×D		mm	816×880×370	1,215×880×370	1,215×880×370	1,345×880×320
Weight			kg	87	117	110	112
Drawing No.				4D008260A			4D006820A

Notes:

★1. Nominal cooling capacities are based on the following conditions:
Return air temperature : 27°CDB, 19.5°CWB, Outdoor temperature : 35°CDB Equivalent ref.piping : 5m (Horizontal)

★2. Capacities are gross capacities which do not include a deduction for evaporator fan motor heat.

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m^3/min×35.3

Model		Indoor Units		FD08KTAL	FD10KTAL	FD15KTAL	FD20KTAL
		Outdoor Units		RU08KTAL	RU10KTAL	RU08KTAL×2	RU10KTAL×2
★1 Cooling Capacity			kW	24.3	29.7	48.6	59.3
			Btu/h	83,000	101,200	166,000	202,400
			kcal/h	20,900	25,500	41,800	51,000
Capacity Steps			%	100-0	100-0	100-50-0	100-50-0
Piping Connections	Indoor Unit	Liquid	mm	ϕ12.7 (Brazing)	ϕ15.9 (Brazing)	2×ϕ12.7 (Brazing)	2×ϕ15.9 (Brazing)
		Gas	mm	ϕ25.4 (Brazing)	ϕ31.8 (Brazing)	2×ϕ25.4 (Brazing)	2×ϕ31.8 (Brazing)
		Drain	mm	FPS3/4B	FPS3/4B	FPS1B	FPS1B
	Outdoor Unit	Liquid	mm	ϕ12.7 (Brazing)	ϕ15.9 (Brazing)	2×ϕ12.7 (Brazing)	2×ϕ15.9 (Brazing)
		Gas	mm	ϕ25.4 (Brazing)	ϕ31.8 (Brazing)	2×ϕ25.4 (Brazing)	2×ϕ31.8 (Brazing)
		Drain	mm	—	—	—	—
Indoor Units				**FD08KTAL**	**FD10KTAL**	**FD15KTAL**	**FD20KTAL**
Coil	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)			
	Row×Stages×Fin Pitch			3×22×2.0	3×22×2.0	3×26×2.0	3×26×2.0
	Face Area		m²	0.443	0.540	0.784	0.990
Fan	Type			Sirocco Fan			
	Drive			Belt Drive			
	Air Flow Rate		m³/min.	68	83	136	166
			cfm	2,400	2,929	4,800	5,860
	Ext. Static Pressure		mmH_2O	10	10	15	15
	Motor Output		kW	1.5	1.5	2.2	3.7
Dimensions		H×W×D	mm	500×1,130×850	500×1,330×850	625×1,620×850	625×1,980×850
Weight			kg	93	104	161	187
Outdoor Units				**RU08KTAL**	**RU10KTAL**	**RU08KTAL×2**	**RU10KTAL×2**
Color				Ivory White			
Compressor	Type			Hermetically Sealed Scroll Type			
	Model			JT236D-P1	JT300D-P1	2×(JT236D-P1)	2×(JT300D-P1)
	No. of Cylinders			—	—	—	—
	Motor Output		kW	5.5	7.5	2×5.5	2×7.5
Refrigerant	Model			R22			
	Charge		kg	5.0 (Fiels Charge for 5m)	6.1 (Fiels Charge for 5m)	2×5.0 (Fiels Charge for 5m)	2×6.1 (Fiels Charge for 5m)
Refrigerant Oil	Model			SUNISO 4GSDID-K			
	Charge		l	4.0	4.0	2T4.0	2T4.0
Coil	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)			
	Rows×Stages×Fin Pitch			2×40×2.0	2×50×2.0	2×(2×40×2.0)	2×(2×50×2.0)
	Face Area		m²	1.57	1.97	2×1.57	2×1.97
Refrigerant Control				Capillary Tube			
Ref. Piping	Standard Length		m	5	5	5	5
	Max. Length		m	50 (Equivalent Length 70m)	50 (Equivalent Length 70m)	50 (Equivalent Length 70m)	50 (Equivalent Length 70m)
	Max. Height Difference		m	30	30	30	30
Fan	Type			P52H11S	P52H11S	2TP52H11S	2TP52H11S
	Model			Propeller			
	Air Flow Rate 50/60Hz		m³/min	160	190	2×160	2×190
			cfm	5,648	6,707	2×5,648	2×6,707
	Motor Output		W	230+190	230+190	2×(230+190)	2×(230+190)
Safety Devices				Thermal Protector for Compressor and Outdoor Fan Motor, High Pressure Switch, Over Current Relay (Compressor and Indoor Fan Motor), Reverse Phase Protector, Fuse.			
Dimensions		H×W×D	mm	1,220×1,280×690	1,440×1,280×690	2×(1,220×1,280×690)	2×(1,440×1,280×690)
Weight			kg	176	188	2×176	2×188
Drawing No.				4D006820A		4D008678	

Notes:

★1. Nominal cooling capacities are based on the following conditions:
Return air temperature : 27°CDB, 19.5°CWB, Outdoor temperature : 35°CDB Equivalent ref.piping : 5m (Horizontal)

★2. Capacities are gross capacities which do not include a deduction for evaporator fan motor heat.

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

Part 4 Remote Controller (Optional Accessories)

1. Optional accessories

1.1 Option List

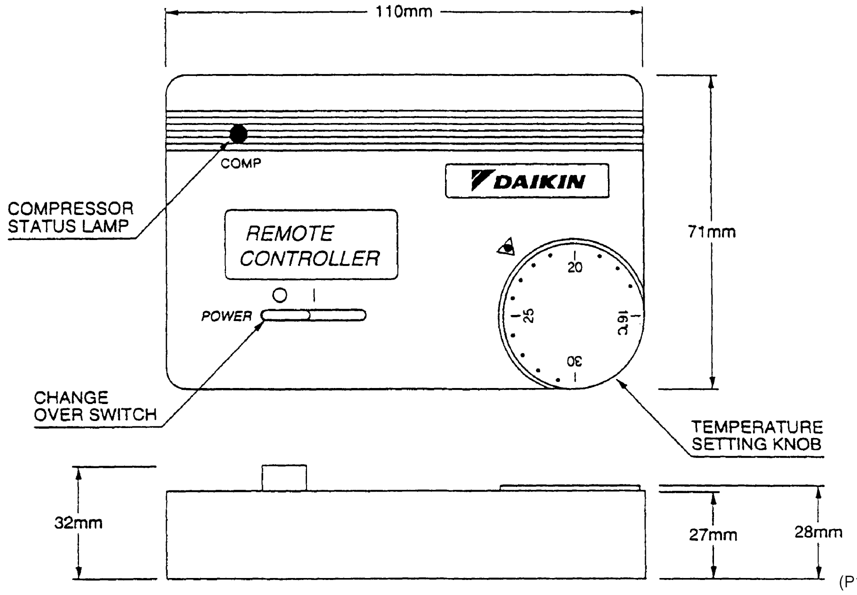
Option		Remark	Applicable Model	
			FD03K, 04K Y1, VAL FD05K, 06K, 08K, 10K Y1, TAL	FD15K, 20K Y1, TAL
Remote Controller	Mechanical Type	With 3 Minutes Timer Wired Type	KRC47-3	KRC47-3 NOTE) 1
		—		KRC17-2B NOTE) 2
	Digital Type	With 3 Minutes Timer	KRC47-5	KRC47-5 NOTE) 2
3 Minutes Timer		—	KTA19A1	
Central Control Adaptor Kit			DTA107A55	

Notes:
1. In case of 100-0% operation.
2. In case of 100-50-0% operation.
3. If you use KRC17-2B or Local remote controller, 3 minutes timer KTA19A1 is necessary for the recycling guard of compressor.

1.2 Remote Controller (KRC47-3)

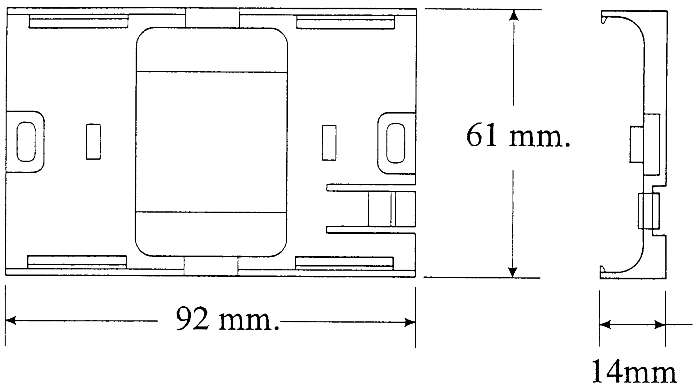
KRC47-3 contains the following parts, and they are packed in one carton.

1.2.1 Remote Controller



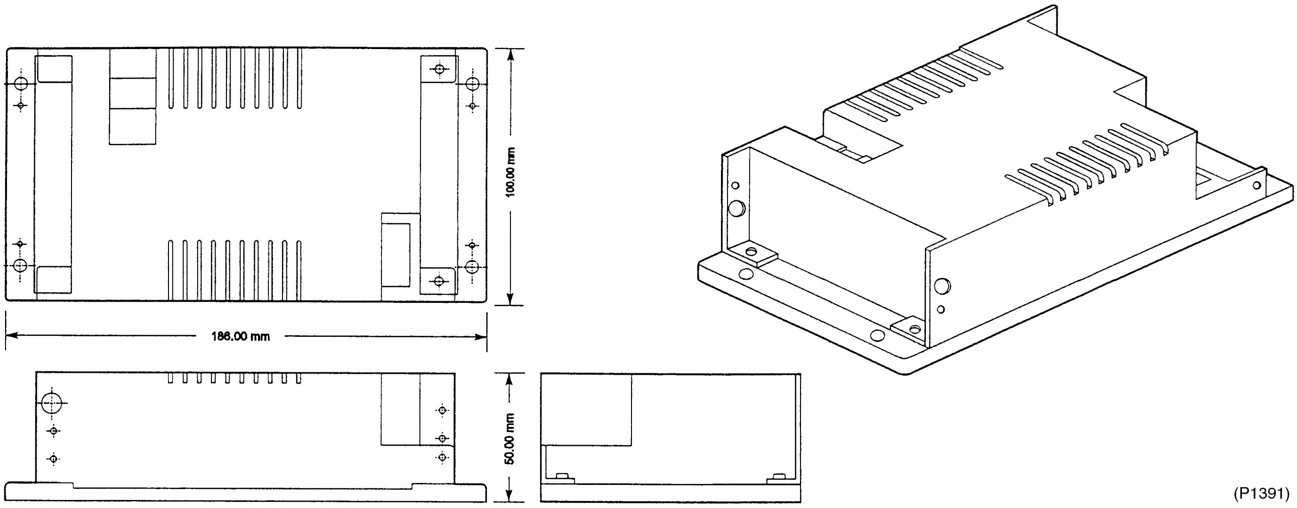
(P1251)

1.2.2 Holder



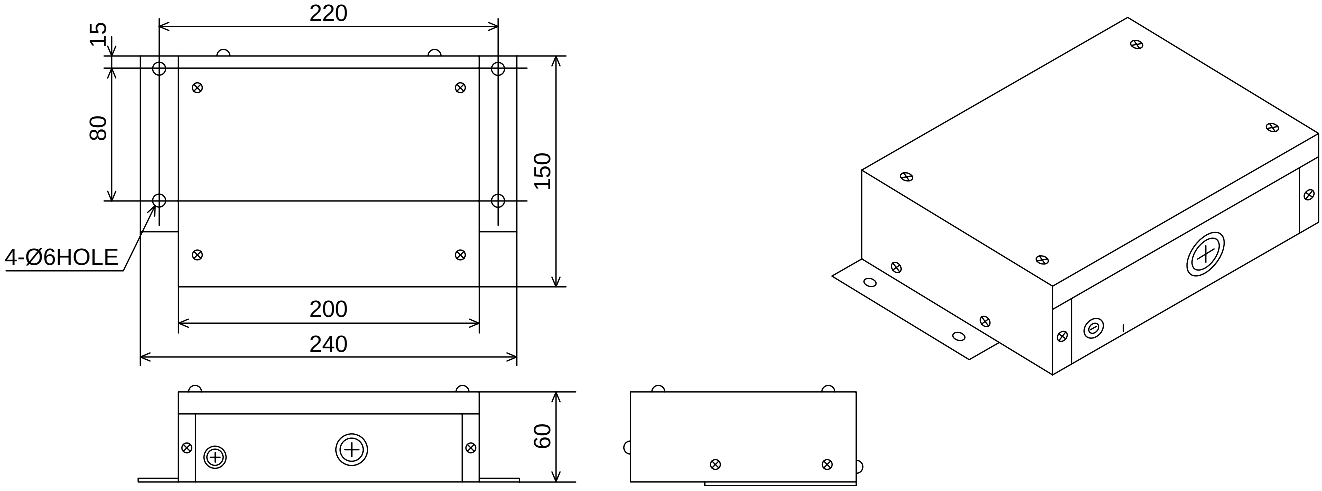
(P1252)

1.2.3 Control Board (Box)



(P1391)

or



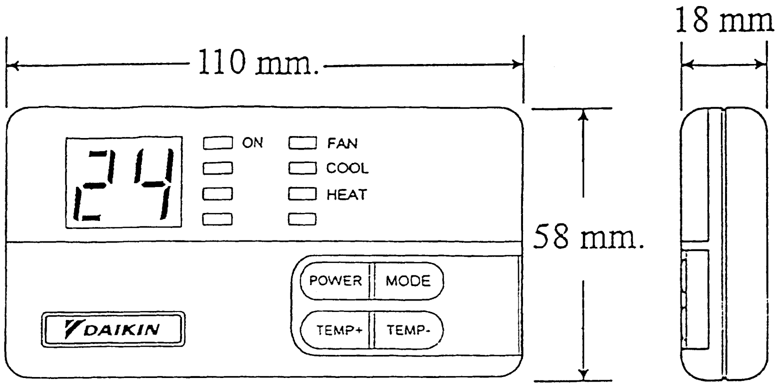
(P1392)

1.2.4 Wire Cable

Cable length : 4m (8m or 15m will be available on request)
Connecting cable between ① and ③.

1.3 Digital Remote Controller (KRC47-5)

1.3.1 Digital Remote Controller



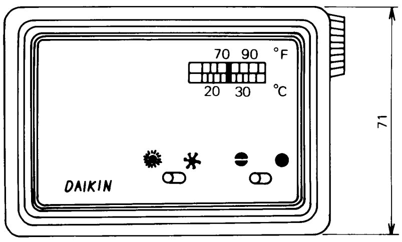
(P1254)

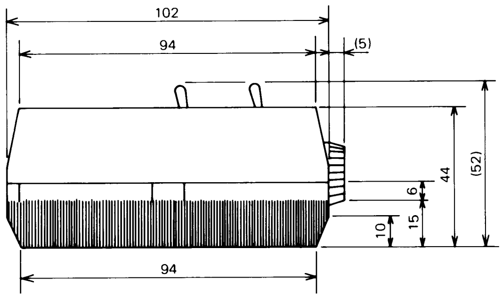
②~④ will be the same as (2)

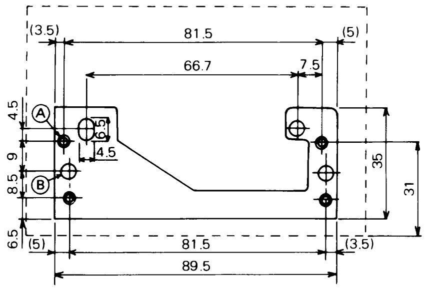
1.4 Remote Controller (KRC17-2B)

1.4.1 Digital Remote Controller

KRC17-2B







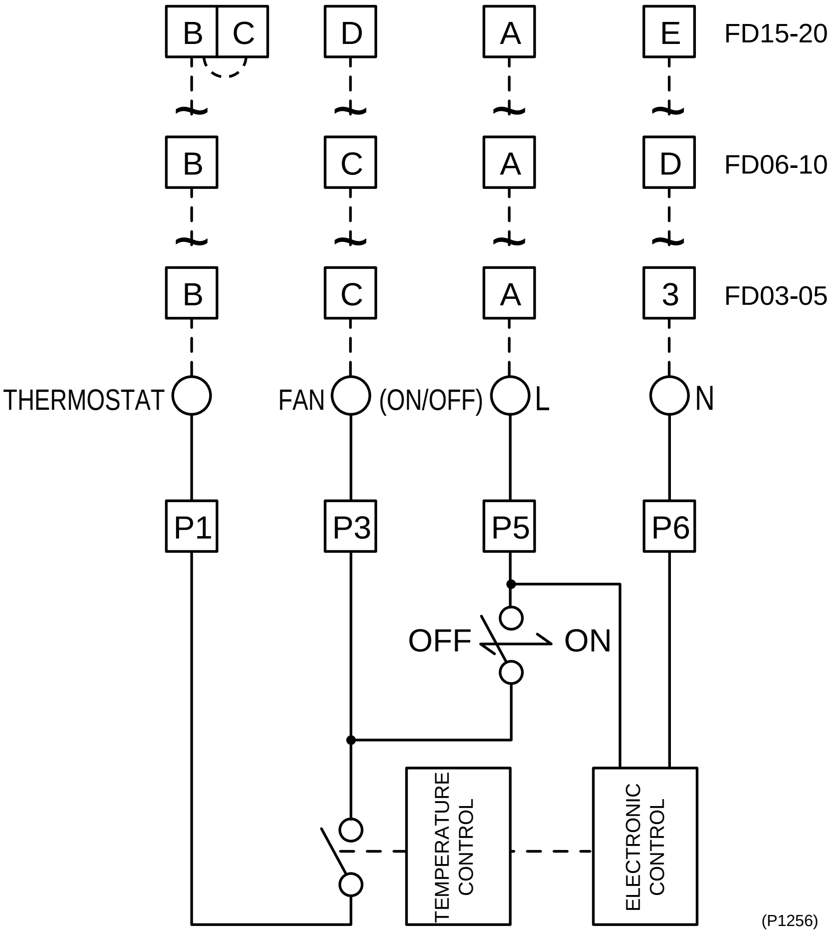
Ⓐ Screw hole for remote controller (2-M4)
Ⓑ Screw hole for wall mounting (φ4.4)

Note: The screws for remote controller and terminal for connecting wires (11 pcs) are attached.

(P1255)

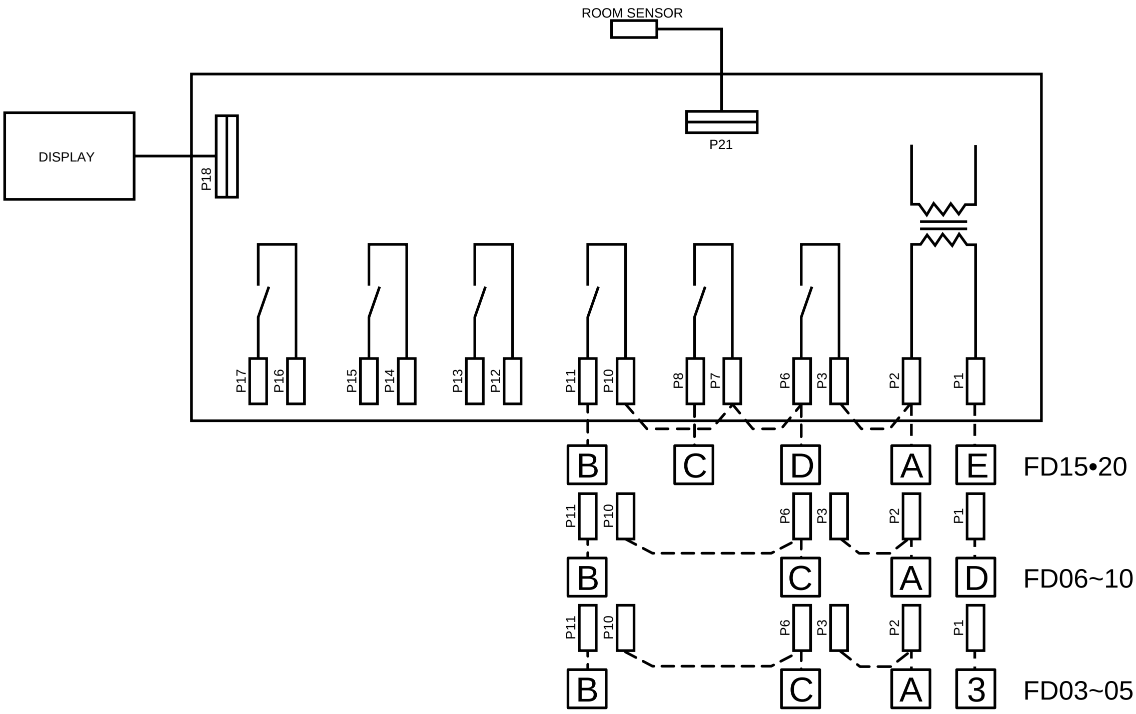
1.5 Internal Wiring Diagram

KRC47-3



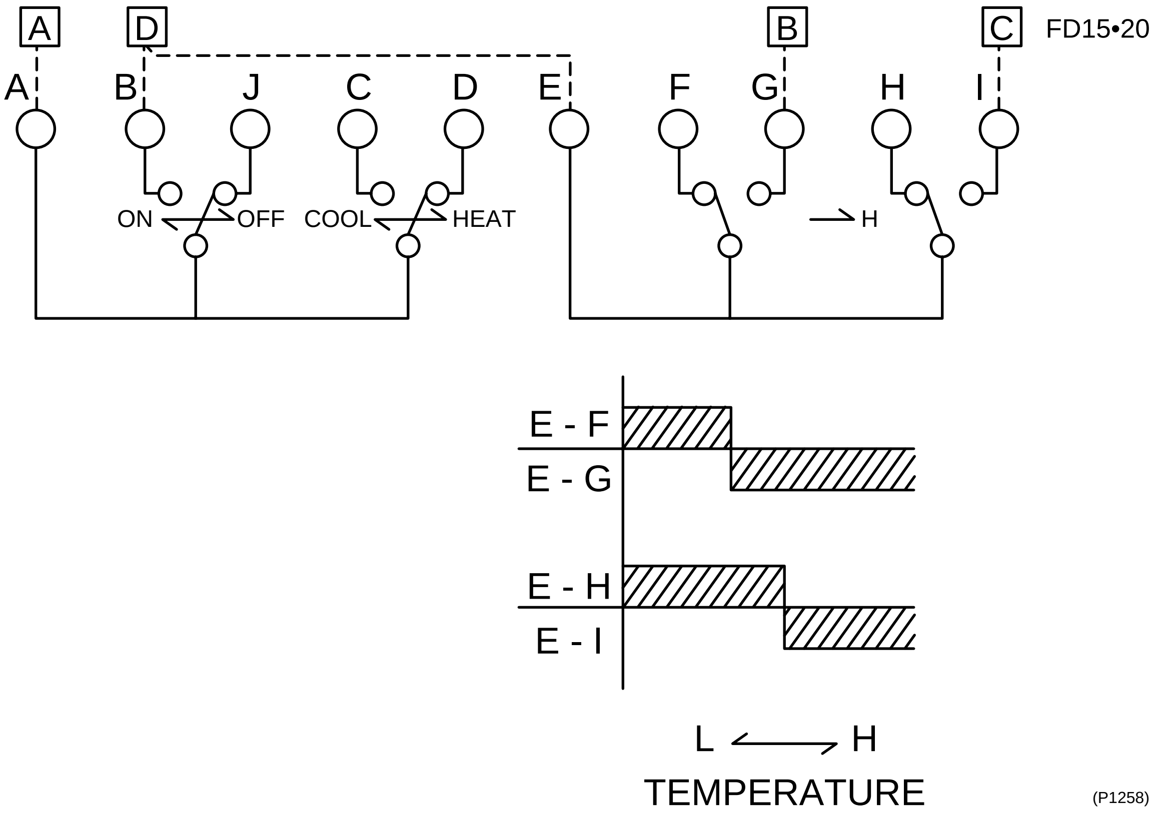
(P1256)

KRC47-5



(P1257)

KRC17-2B


A
D
B
C
FD15•20
A
B
J
C
D
E
F
G
H
I
ON
OFF
COOL
HEAT
H
E - F
E - G
E - H
E - I
L
H
TEMPERATURE
(P1258)

Part 5
Field Piping and Wiring

1. Field Piping and Wiring

1.1 FD03K, 04K, 05K

1.1.1 Indoor Unit Installation

1. Fit the hanger bracket into the suspension bolt (refer to Fig. 5). Using washers, secure and tighten both the upper and lower nuts to the suspension bolt.
2. Adjust the unit to the desired height.
3. Make sure that the unit is level (refer to Fig. 6).
4. Adjust the unit using a level. If it is installed unevenly, water may leak the unit.
5. When making adjustments, test all four corners of the unit with the level or use a vinyl tube filled with water.
6. Secure and tighten the upper nuts.

Fig.5

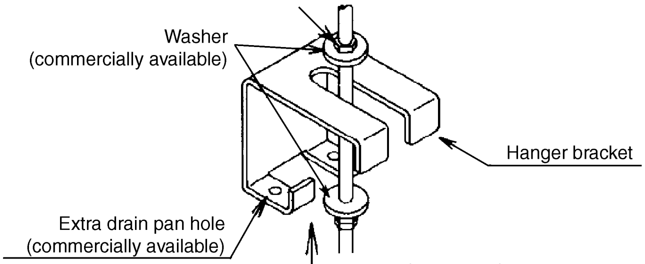
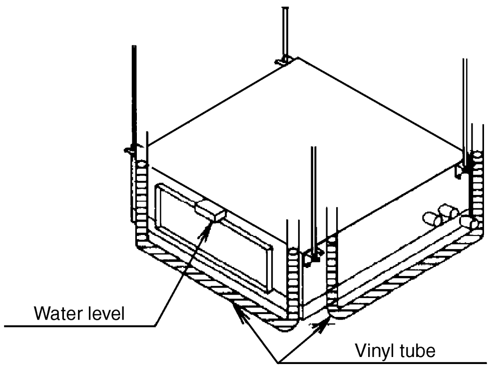


Fig.6



1.1.2 Refrigerant Piping Work

<For outdoor units, see the outdoor unit installation manual>

Warning **Do not mix gas other than the specified refrigerant into the refrigerant cycle. Ventilate the area should any refrigerant leak during installation.**

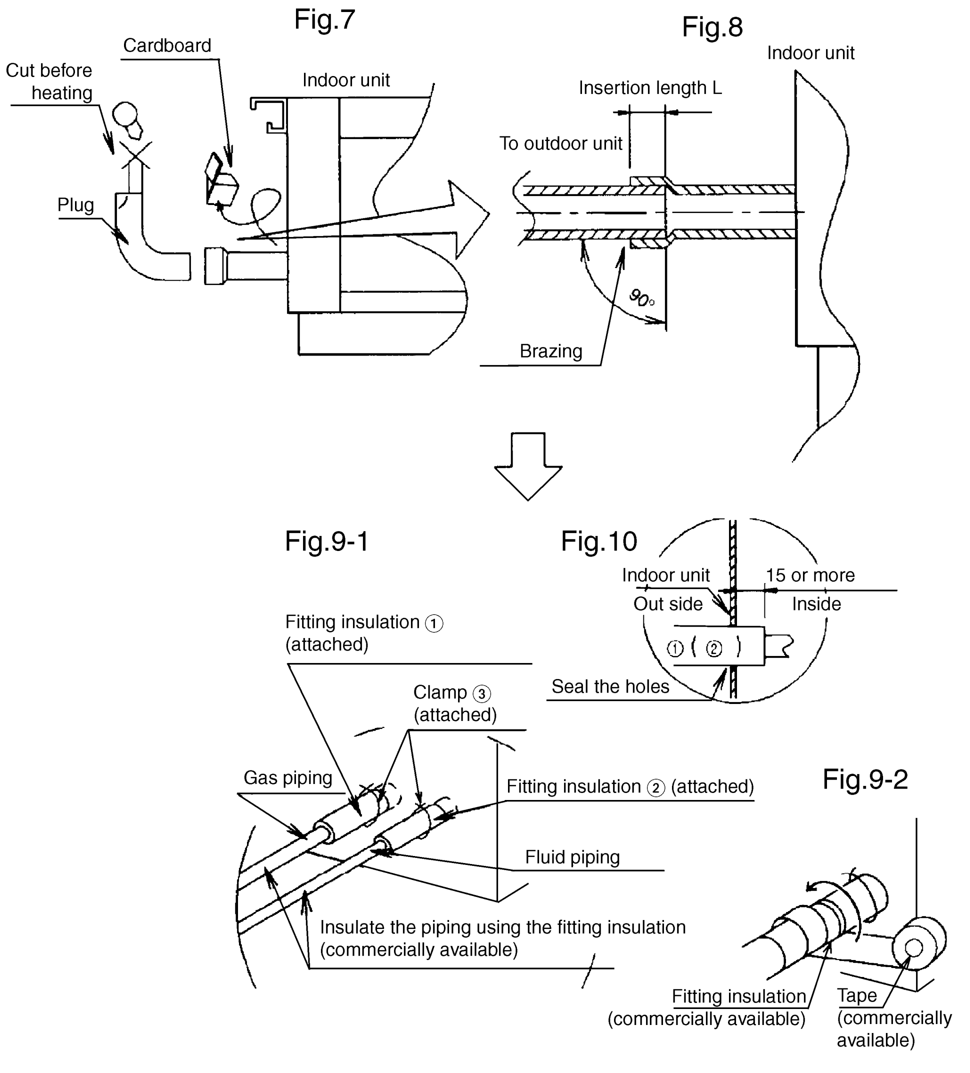
- Piping should be brazed onto the indoor unit. Check the size of the refrigerant piping with the chart below.
- Use seamless copper piping only.

	Refrigerant Piping Size	
	Gas pipe	Fluid pipe
FD03 type	ϕ15.9×t1.0, L=10	ϕ9.5×t0.8, L=7
FD04 type	ϕ19.1×t1.0, L=10	ϕ9.5×t0.8, L=7
FD05 type	ϕ19.1×t1.0, L=10	ϕ9.5×t0.8, L=7

(See Fig. 8 in reference to “L”)

Warning **Do not heat the plugs before cutting off their ends in order to release pressure, otherwise the plugs may burst.**

- Remove the cardboard and cut the end of the plug(s) before heating the pipes to remove the plug(s) (refer to Fig. 7).
- After brazing the pipes as shown in Fig. 8, use the fitting insulation to secure the pipe inside of the unit (see Figs. 9 and 10). Install the clamps as close to the body as possible to absorb leaking condensation.
- Wrap the lifting insulation’s joints with tape (commercially available), making sure that there is no gap between the fitting insulation. (see Fig. 9-2)



(P1423)

1.1.3 Drain Piping Work

Warning **The drain pipe must be installed as shown in the diagram below to avoid water damage caused by leaks and condensation.**

- Assemble the unit as shown in Fig. 11.
- The drain pie outlet can be installed on either the left or right side. The drain plug can be removed and placed on either the left or right side as well.
- For best results, try to keep the piping as short as possible. Slant the piping at an angle to improve flow (the drain pipe provided with the indoor unit has a PT 3/4 internal thread). See Fig. 11.
- Securely insulate the drain pipe.
- It is necessary to provide a drain trap in the drain outlet to relieve negative pressure that exists within the unit compared to the outside atmospheric pressure when the unit is operating. If a drain trap is not provided, splashes or an odor may be produced.
- Keep pipes as straight as possible for easy cleaning and to prevent the accumulation of dirt and debris.
- After closing the drain pipe on the opposite side of the unit, completely wrap the drain pipes with insulation (see Fig. 11).
- Pour water in the drain pan to test for smooth drainage.
- In humid environments, use an extra drain pan to cover the entire area of the indoor unit.

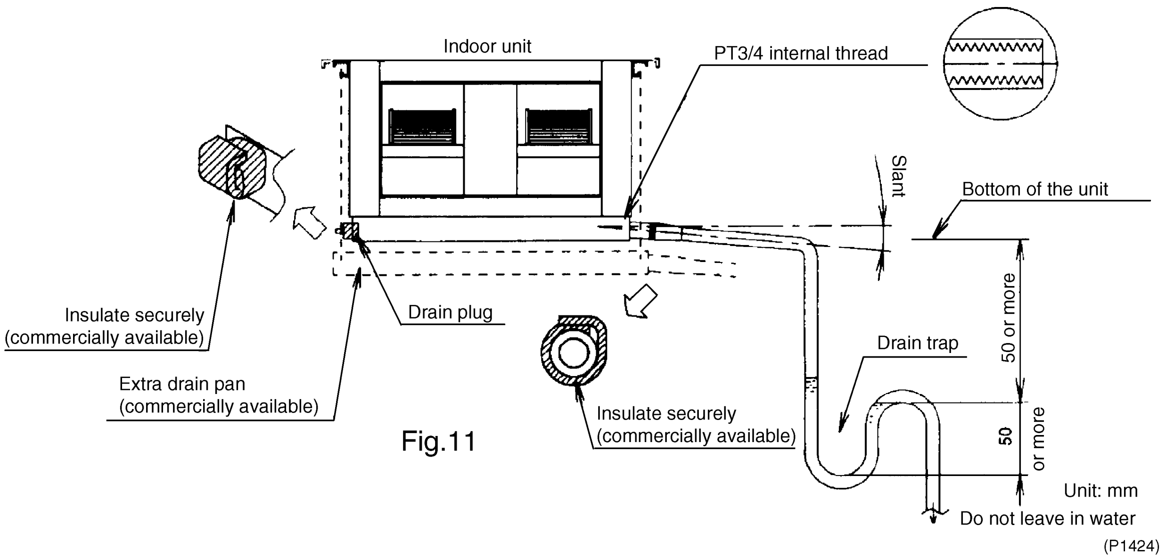


Fig.11

1.1.4 Electric Wiring

- All commercially available supplies, materials and electrical parts must conform to local codes.
- Use copper wire only.
- For electric wiring work, refer to the “Wiring Diagram” attached to the unit.
- For remote controller wiring, refer to the remote controller’s installation manual.
- All wiring must be performed by an authorized electrician.
- A circuit breaker capable of controlling the power supply to the entire system must be installed.
- Refer to the installation manual attached to the outdoor unit for the size of the power supply electrical wire to be used to connect with the outdoor unit, the capacity of the circuit breaker/ switch, and wiring instructions.

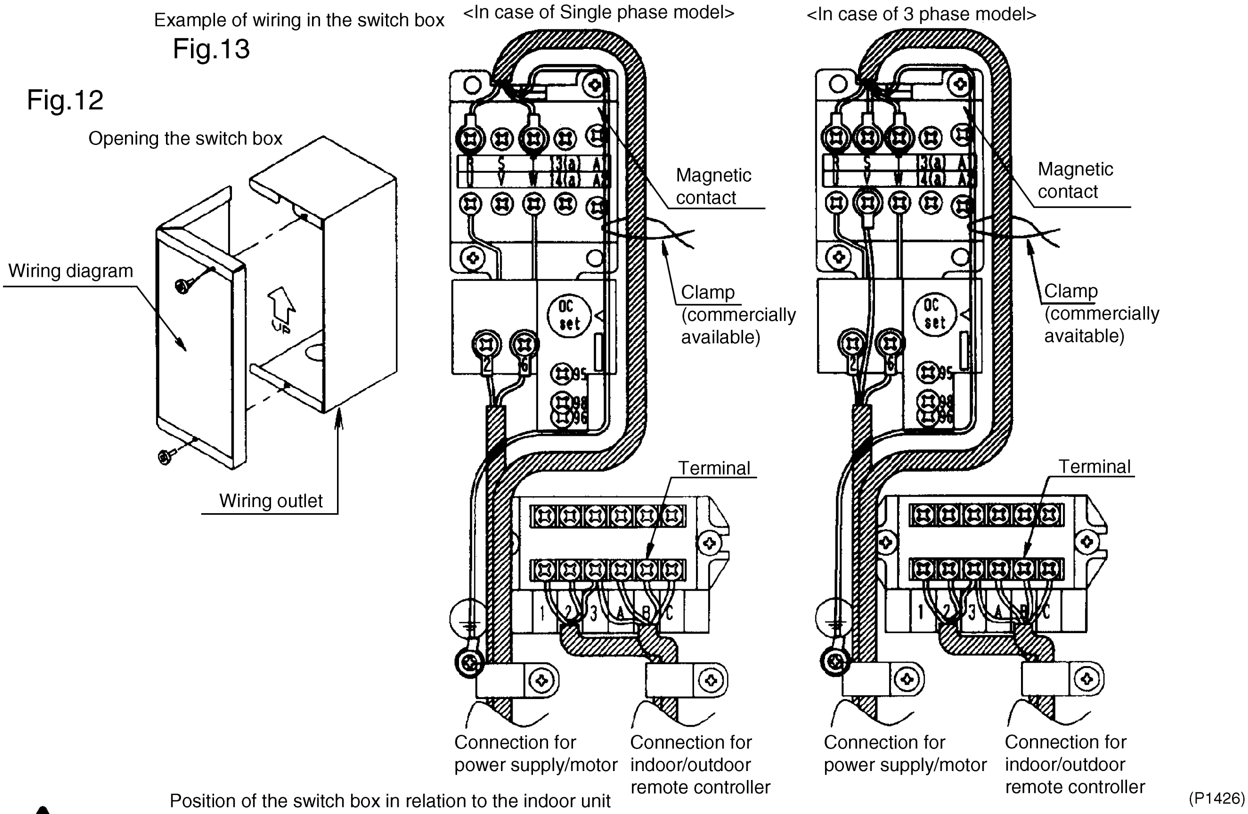
<Methods of unit wiring and connecting remote controller cords>

Open the switch box cover by removing the screws (see Fig. 12).

- For connection between the power supply and the motor, refer to Fig. 13. Connect the wiring to the corresponding phase on the magnetic contact.
- For connection between the indoor/outdoor remote controller, refer to Fig. 13. Use the corresponding numbers on the outdoor unit to connect the outdoor wires to the indoor terminal.

Refer to the manual attached to the remote controller (optional) and the wiring diagram for the indoor unit.

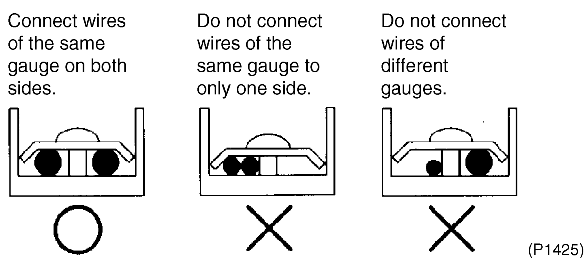
- Push the wires through the wiring outlet located on the bottom of the switch box (see Figs. 12 and 13). After the wires are connected, keep them stored within the switch box to prevent damage.



(P1426)

Warning Observe the notes mentioned below while connecting wire to the power supply terminal board.

- Do not connect wires of different gauges to the same power supply terminal. (Looseness in the connection may cause overheating.)
- When connecting wires of the same gauge, connect them according to the figure on the right.



(P1425)

Note: A commercially available remote controller can be used if its specifications are compatible with those shown in the wiring diagram and technical materials.

- **Remote Controller Wiring Specifications**

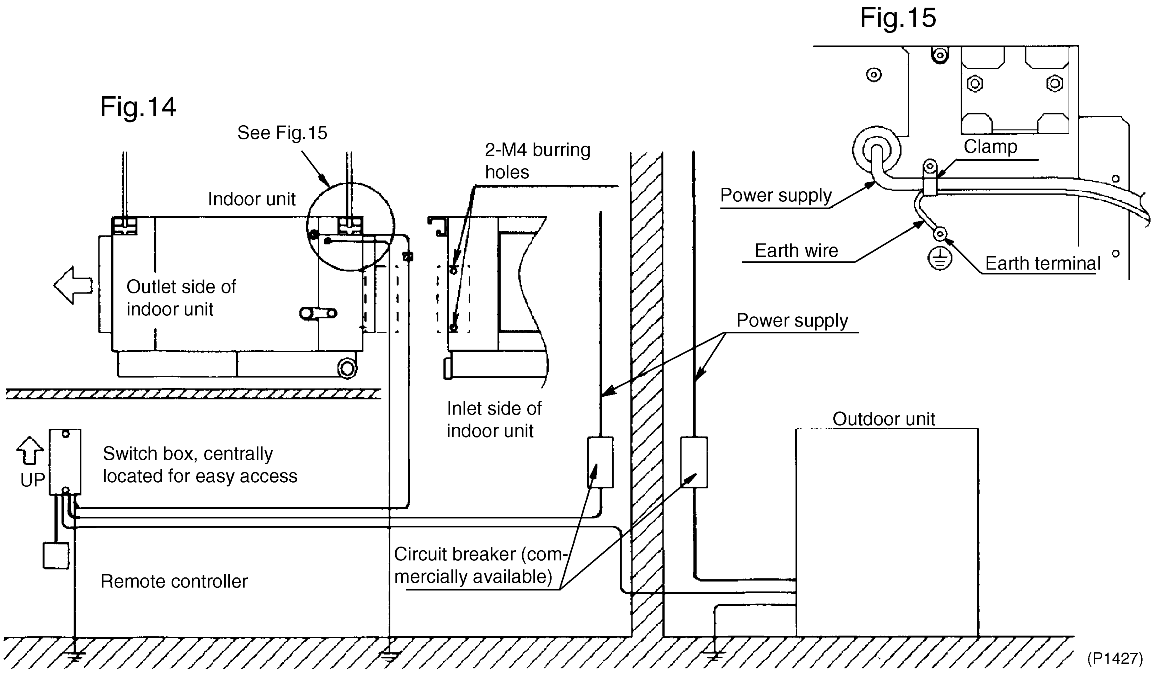
	Wire	Size (mm²)
Unit remote controller	UL1015AWG18 or equivalent	0.75 each

Caution **Be sure to use a 3-minutes delay timer when starting the compressor, otherwise the compressor may not start.**

- Install the switch box in an easily accessible location (see Fig. 14). If there is no place nearby that might provide easy access to the switch box, install it onto the air inlet side of the indoor unit using the two holes on he side plate.

Warning **Do not install the switch box on the air outlet side of the coil (heat exchanger), or under any of the surrounding piping to avoid electrical fire or shock caused by leaking condensation.**

- Install the wiring of the switch box facedown.
- Clamp the earth and power supply wires together to provide support and relieve tension at the earth terminal (see Fig. 15).



1.1.5 Test Operation

- Check to make sure that all installation procedures have been completed according to the installation manuals for the indoor unit, outdoor unit and the remote controller.
- Turn on the remote controller to check the rotational direction of the fan and for proper air flow. If the fan rotates in the wrong direction, change the power phase supply connection (3 phase models).
- After connection changes or any other adjustments are made, allow the unit to run in order to confirm that it is operating properly.

1.2 FD06K, 08K, 10K

1.2.1 Indoor Unit Installation

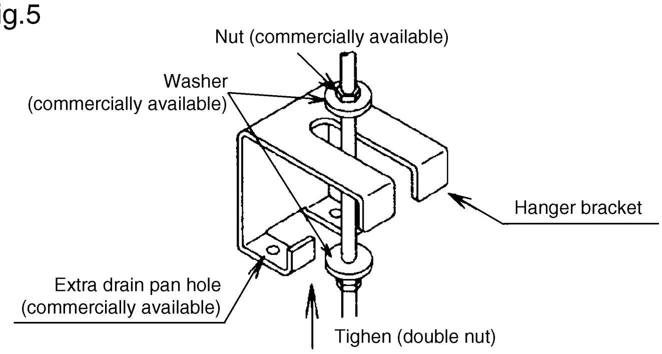
1. Fit the hanger bracket into the suspension bolt (refer to Fig. 5). Using washers, secure and tighten both the upper and lower nuts to the suspension bolt.
2. Adjust the unit to the desired height.
3. Make sure that the unit is level (refer to Fig. 6).

◆ Adjust the unit using a level. If it is installed unevenly, water may leak from the unit.

◆ When making adjustments, test all four corners of the unit with the level or use a vinyl tube filled with water.

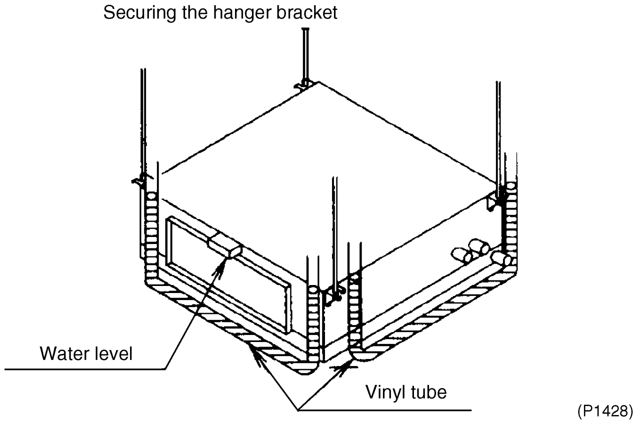
4. Secure and tighten the upper nuts.

Fig.5



Securing the hanger bracket

Fig.6



1.2.2 Refrigerant Piping Work

<For outdoor units, see the outdoor unit installation manual>

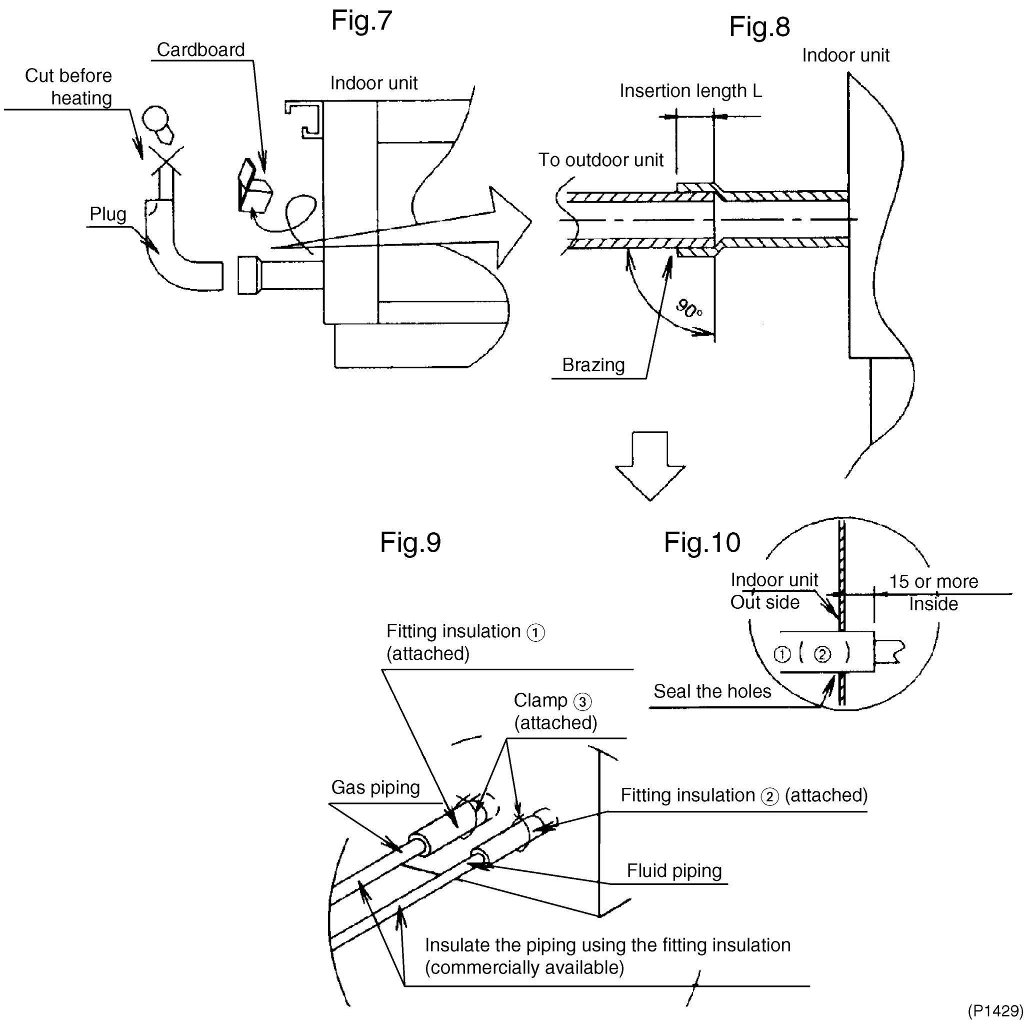
Warning **Do not mix gas other than the specified refrigerant into the refrigerant cycle. Ventilate the area should any refrigerant leak during installation.**

- Piping should be brazed onto the indoor unit. Check the size of the refrigerant piping with the chart below.
- Use seamless copper piping only.

	Refrigerant Piping Size	
	Gas pipe	Fluid pipe
FD06 type	ϕ19.1×t1.0, L=10	ϕ9.5×t0.8, L=7
FD08 type	ϕ25.4×t1.2, L=12	ϕ12.7×t0.9, L=8
FD10 type	ϕ31.8×t1.4, L=12	ϕ15.9×t0.95, L=8

(See Fig. 8 in reference to “L”)

- Remove the cardboard and cut the end of the plug(s) before heating the pipes to remove the plug(s) (refer to Fig. 7).
- After brazing the pipes as shown in Fig. 8, use the fitting insulation to secure the pipe inside of the unit (see Figs. 9 and 10). Install the fitting insulation as close to the body as possible to absorb leaking condensation. Fitting insulation is provided (also commercially available).



Note: Gas and fluid piping placement is opposite from the diagram for model type FD08·10.

1.2.3 Drain Piping Work

Warning **The drain pipe must be installed as shown in the diagram below to avoid water damage caused by leaks and condensation.**

- Assemble the unit as shown in Fig. 11.
- The drain pipe outlet can be installed on either the left or right side. The drain plug can be removed and placed on either the left or right side as well.
- For best results, try to keep the piping as short as possible. Slant the piping at an angle to improve airflow (the drain pipe provided with the indoor unit is PT 3/4 internal thread). See Fig. 11.
- Securely insulate the drain pipe.
- It is necessary to provide a drain trap in the drain outlet to relieve negative pressure that exists within the unit compared to the outside atmospheric pressure when the unit is operating.
- Keep pipes as straight as possible for easy cleaning and to prevent the accumulation of dirt and debris.
- After closing the drain pipe on the opposite side of the unit, completely wrap the drain pipes with insulation (see Fig. 11).
- pour water in the drain pan to test for smooth drainage.
- In humid environments, use an extra drain pan to cover the entire area of the indoor unit.

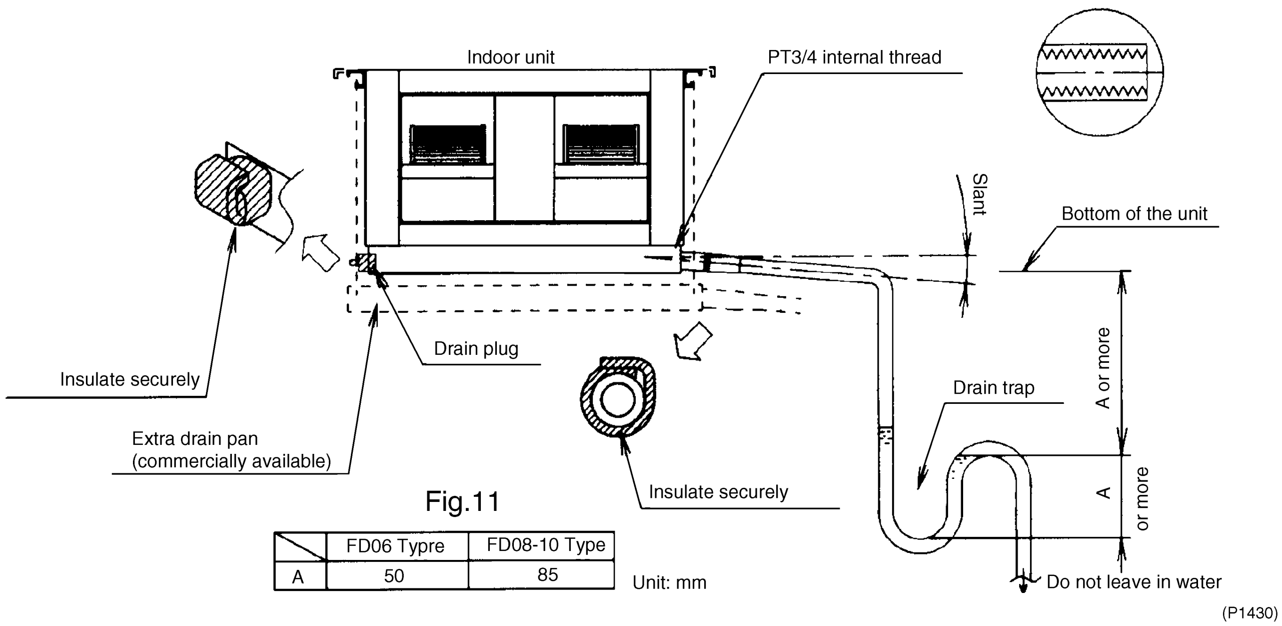


Fig.11

	FD06 Typre	FD08-10 Type
A	50	85

1.2.4 Electric Wiring

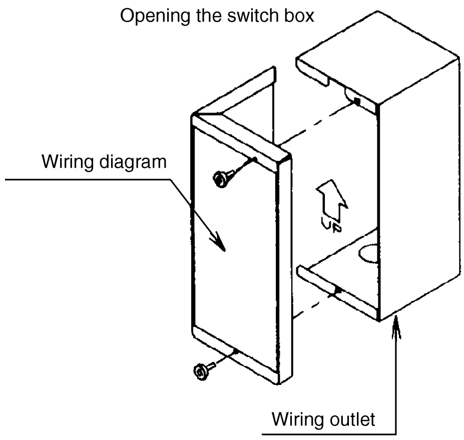
- All commercially available supplies, materials and electrical parts must conform to local codes.
- Use copper wire only.
- For electric wiring work, refer to the “Wiring Diagram” attached to the unit.
- For remote controller wiring, refer to the remote controller’s installation manual.
- All wiring must be performed by an authorized electrician.
- A circuit breaker capable of controlling the power supply to the entire system must be installed.
- Refer to the installation manual attached to the outdoor unit for the size of the power supply electrical wire to be used to connect with the outdoor unit, the capacity of the circuit breaker/ switch, and wiring instructions.

<Methods of unit wiring and connecting remote controller cords>

Open the switch box cover by removing the screws (see Fig. 12).

- For connection between the power supply and the motor, refer to Fig. 13. Connect the wiring to the corresponding phase on the magnetic contact.
- For connection between the indoor/outdoor remote controller, refer to Fig. 13. Use the corresponding numbers on the outdoor unit to connect the outdoor wires to the indoor terminal.
  Refer to the manual attached to the remote controller (optional) and the wiring diagram for the indoor unit.
- Push the wires through the wiring outlet located on the bottom of the switch box (see Figs. 12 and 13). After the wires are connected, keep them stored within the switch box to prevent damage.

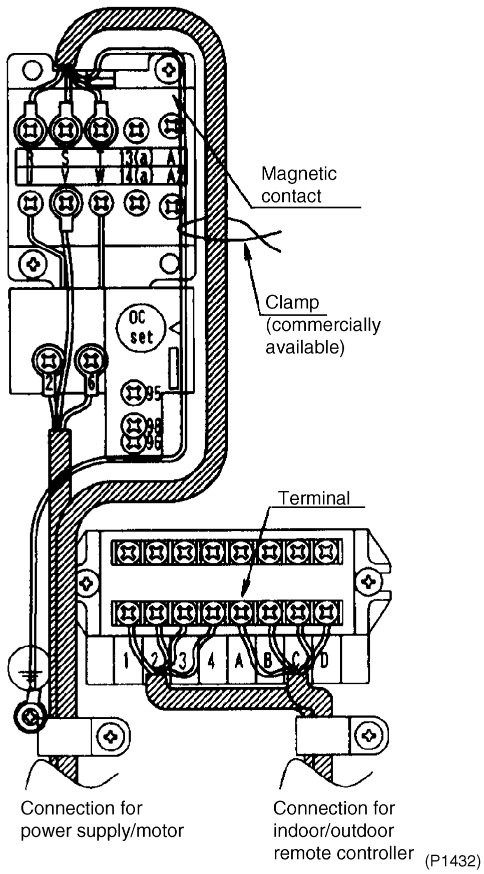
Fig.12



Position of the switch box in relation to the indoor unit

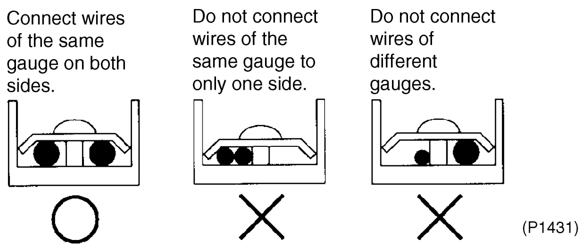
Example of wiring in the switch box

Fig.13



Warning Observe the notes mentioned below while connecting wire to the power supply terminal board.

- Do not connect wires of different gauges to the same power supply terminal.
  (Looseness in the connection may cause overheating.)
- When connecting wires of the same gauge, connect them according to the figure on the right.



Note: A commercially available remote controller can be used if its specifications are compatible with those shown in the wiring diagram and technical materials.

■ **Remote Controller Wiring Specifications**

	Wire	Size (mm²)
Unit remote controller	UL1015AWG18 or equivalent	0.75 each

Caution **Be sure to use a 3-minutes delay timer starting the compressor, otherwise the compressor may not start.**

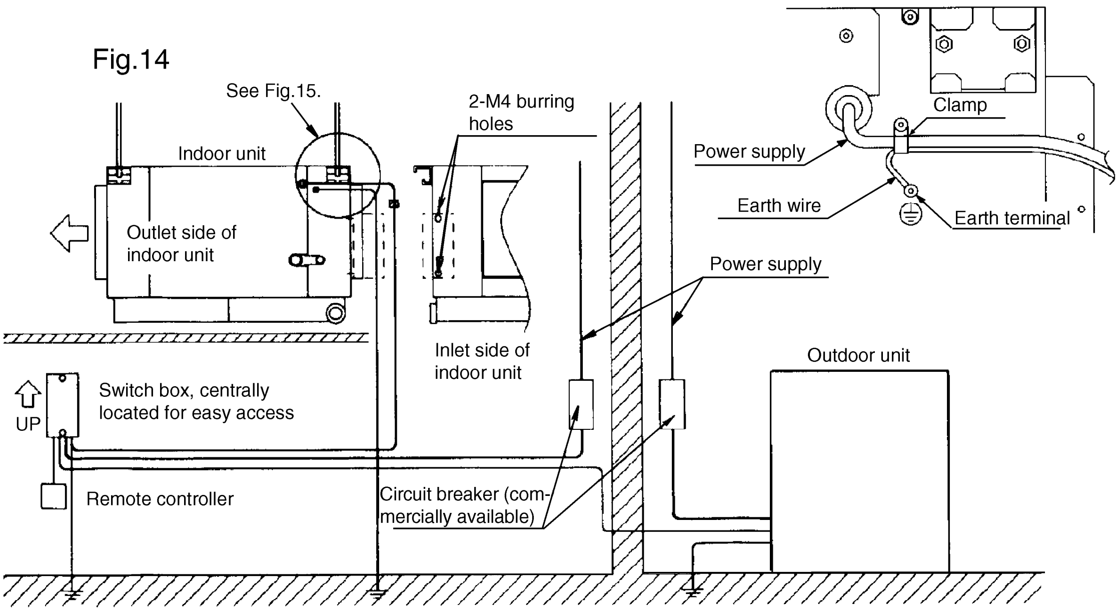
■ Install the switch box in an easily accessible location (see Fig. 14). If there is no place nearby that might provide easy access to the switch box, install it onto the air inlet side of the indoor unit using the two holes on he side plate.

Warning **Do not install the switch box on the air outlet side of the coil (heat exchanger), or under any of the surrounding piping to avoid electrical fire or shock caused by leaking condensation.**

■ Install the wiring of the switch box facedown.
■ Clamp the earth and power supply wires together to provide support and relieve tension at the earth terminal (see Fig. 15).

Fig.15

Fig.14



1.2.5 Test Operation

■ Check to make sure that all installation procedures have been completed according to the installation manuals for the indoor unit, outdoor unit and the remote controller.
■ Turn on the remote controller to check the rotational direction of the fan and for proper air flow. If the fan rotates in the wrong direction, change the power phase supply connection (3 phase models).
■ After connection changes or any other adjustments are made, allow the unit to run in order to confirm that it is operating properly.

1.3 FD15K, 20K

1.3.1 Indoor Unit Installation

1. Secure the unit and supporting plate (commercially available) at four places with M12 screws.
2. Fit the supporting plate into the suspension bolt (refer to Fig. 6).
   Using washers, secure and tighten both the upper and lower nuts to the suspension bolt.
3. Adjust the unit to the desired height.
4. Make sure that the unit is level (refer to Fig. 7).

◆ Adjust the unit using a level. If it is installed unevenly, water may leak from the unit.
◆ When making adjustments, test all four corners of the unit with the level or use a vinyl tube filled with water.

5. Secure and tighten the upper nuts.

Fig.5

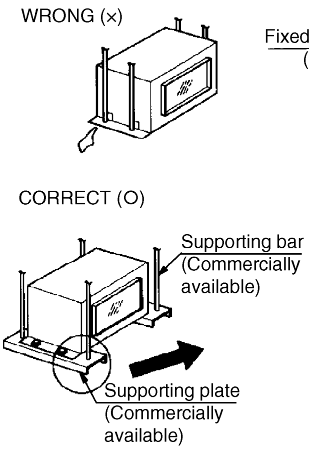


Fig.6

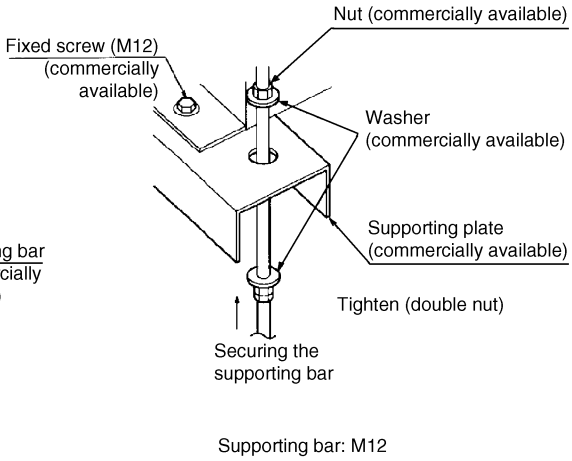
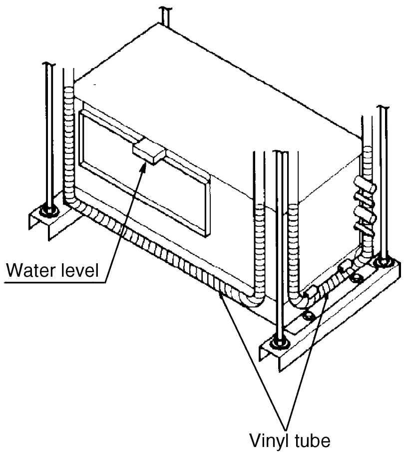


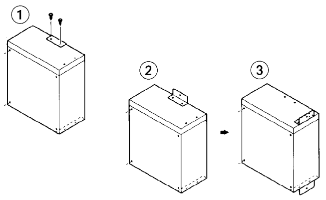
Fig.7



(P1435)

Switch box:

1. Remove the screws and the bracket.
2. Turn over the bracket so that it is upside-down, then re-install it.



(P1434)

When attaching the switch box to the main unit:

2. Re-install the screws.
3. Remove the screws on the side of the box, then turn over the bracket so that it is upside-down and install it on the side of the box.

Warning **When attaching the switch box to the main unit, be sure to use the enclosed screws (M5×8).**

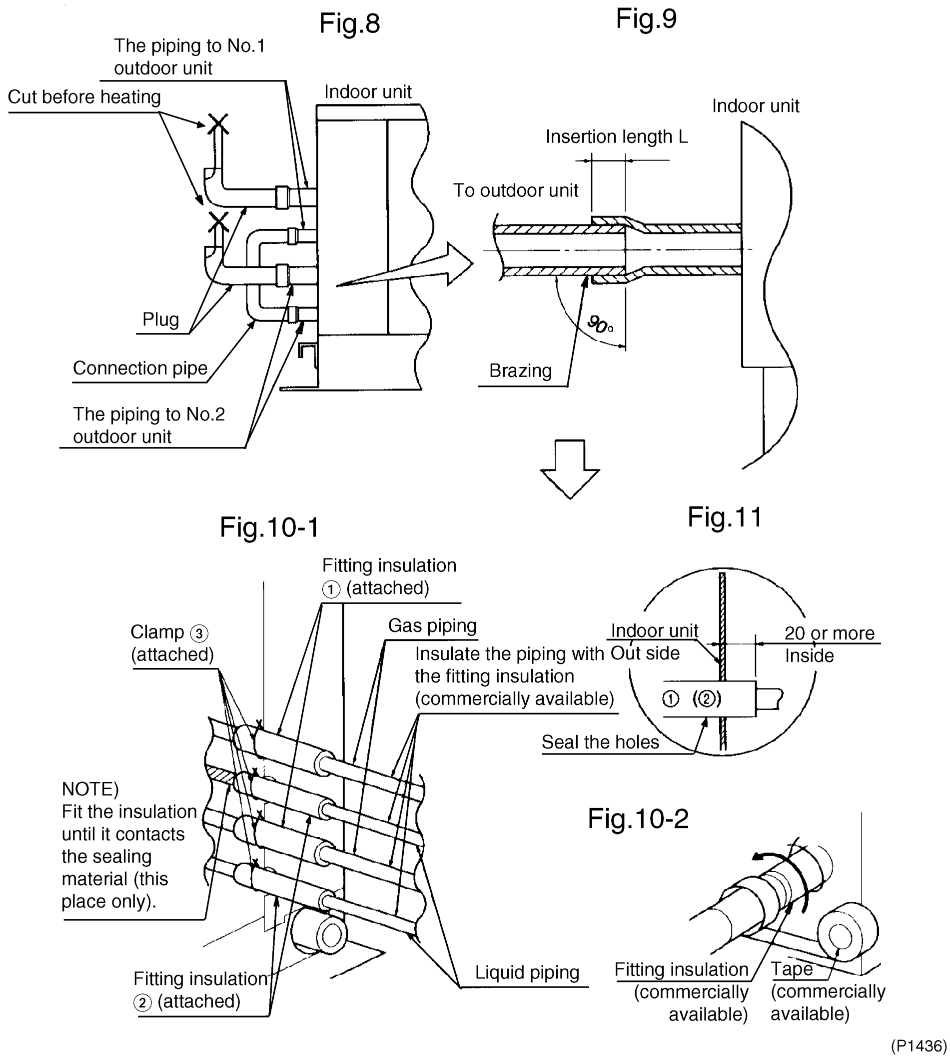
Caution **When the unit is installed, use set place as follows.**

1.3.2 Refrigerant Piping Work

<For outdoor units, see the outdoor unit installation manual.>

Warning **Do not mix gas other than the specified refrigerant into the refrigerant cycle. Ventilate the area should any refrigerant leak during installation.**

- Piping should be brazed onto the indoor unit. Check the size of the refrigerant piping with the chart below.
- Use seamless copper piping only.



	Refrigerant piping size	
	Gas pipe	Liquid pipe
FD15 type	(ϕ25.4×t1.2, L=12)×2	(ϕ12.7×t0.8, L=8)×2
FD20 type	(ϕ31.8×t1.4, L=12)×2	(ϕ15.9×t1.0, L=8)×2

(See Fig. 9 in reference to “L”)

Warning **Do not heat the plugs before cutting off their ends in order to release pressure, otherwise the plugs may burst.**

- Before heating the pipes to remove the plugs and connection pipe, remove the service plate and cut the plug ends (refer to Fig. 8).
- After brazing the pipes as shown in Fig. 9, use the fitting insulation to secure the pipe inside of the unit (see Fig. 10 and 11).
  Clamp the fitting insulation with the attached clamp ③ inside the indoor unit, as shown in Fig. 10-1.
- Wrap the fitting insulation's joints with tape (commercially available), making sure that there is no gap between the fitting insulation. (see Fig. 10-2)

1.3.3 Drain Piping Work

Warning **The drain pipe must be installed as shown in the diagram below to avoid water damage caused by leaks and condensation.**

- Assemble the unit as shown in Fig. 12.
- The drain pipe outlet can be installed on either the left or right side. The drain plug can be removed and placed on either the left or right side as well.
- For best results, try to keep the piping as short as possible. Slant the piping at an angle to improve flow (the drain pipe provided with the indoor unit has a PS 1B internal thread). See Fig. 12.
- Securely insulate the drain pipe.
- It is necessary to provide a drain trap in the drain outlet to relieve negative pressure that exists within the unit compared to the outside atmospheric pressure when the unit is operating. If a drain trap is not provided, splashes or an odor may be produced.
- Keep pipes as straight as possible for easy cleaning and to prevent the accumulation of dirt and debris.
- After closing the drain pipe on the opposite side of the unit, completely wrap the drain pipes with insulation (see Fig. 12).
- Pour water in the drain pan to test for smooth drainage.
- In humid environments, use an extra drain pan to cover the entire area of the indoor unit.

Drain piping connection
PS 1B internal thread + PT 1B external thread
(indoor unit) (commercially available)

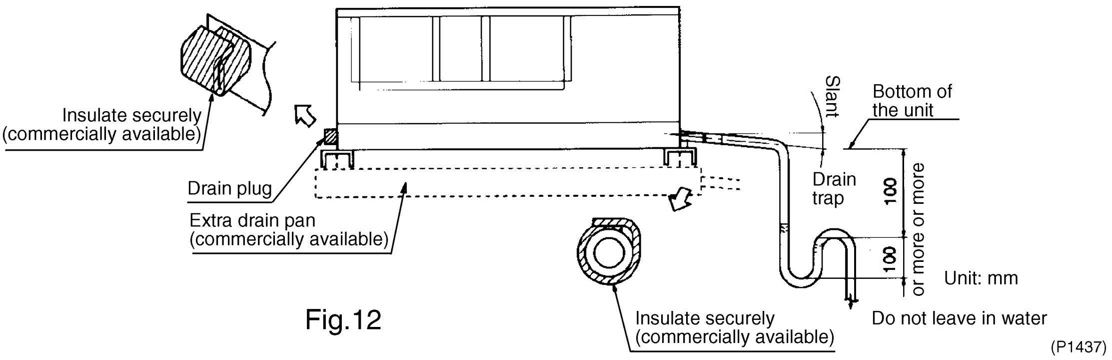


Fig.12

1.3.4 Electric Wiring

- All commercially available supplies, materials and electrical parts must conform to local codes.
- Use copper wire only.
- For electric wiring work, refer to the "WIRING DIAGRAM" attached to the unit.
- For remote controller wiring, refer to the remote controller's installation manual.
- All wiring must be performed by an authorized electrician.
- A circuit breaker capable of controlling the power supply to the entire system must be installed.
- Refer to the installation manual attached to the outdoor unit for the size of the power supply electrical wire to be used to connect with the outdoor unit, the capacity of the circuit breaker/ switch, and wiring instructions.

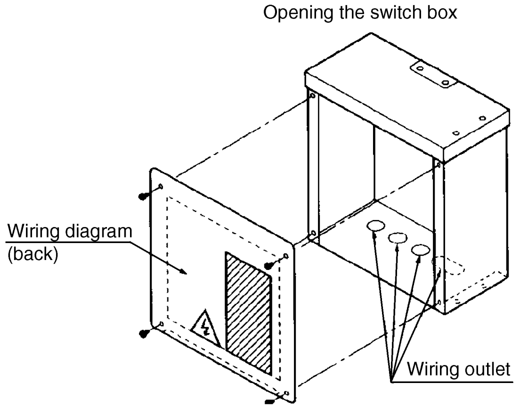
<Methods of unit wiring and connecting remote controller cords>

Open the switch box cover by removing the screws (see Fig. 13).

- For connection between the power supply and motor, refer to Fig. 14.
  In order for the fan to rotate in the correct direction, change the corresponding phase according to the wiring diagram.
- For connection between the indoor/outdoor remote controller, refer to Fig. 14. Use the corresponding numbers on the outdoor unit to connect the outdoor wires to the indoor terminal.
  Refer to the manual attached to the remote controller (optional) and the wiring diagram for the indoor unit.

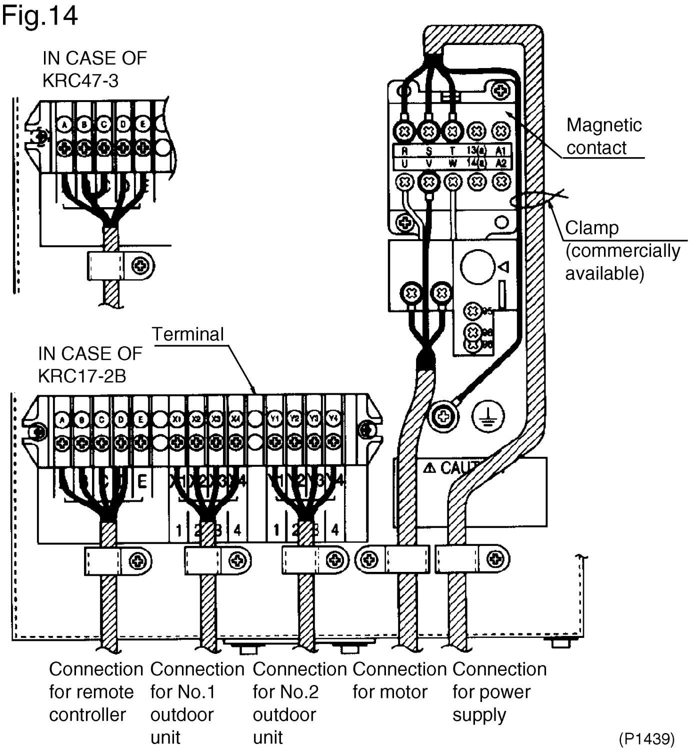
- Push the wires through the wiring outlet located on the bottom of the switch box (see Fig. 13 and 14).
  After the wires are connected, keep them stored within the switch box to prevent damage.

Fig.13



Example of wiring in the switch box

Fig.14

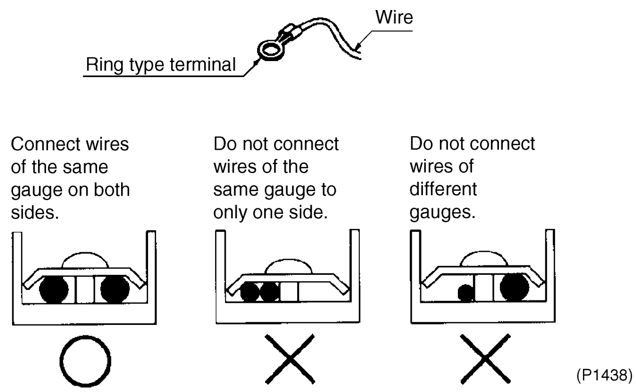


Warning

- Use ring type terminals for connections to the power supply terminal block.
  Where they can not be used, refer to the following.

Observe the notes mentioned below while connecting wire to the power supply terminal board.

- Do not connect wires of different gauges to the same power supply terminal.
  (Looseness in the connection may cause overheating.)
- When connecting wires of the same gauge, connect them according to the figure on the right.



Note: A commercially available remote controller can be used if its specifications are compatible with those shown in the wiring diagram and technical materials.

- **Remote Controller Wiring Specifications**

	Wire	Size (mm²)
Unit remote controller	UL1015AWG18 or equivalent	0.75 each

Caution **Be sure to use a 3-minutes delay timer when starting the compressor, otherwise the compressor may not start.**

- Install the switch box in an easily accessible location (see Fig. 15). If there is no place nearby that might provide easy access to the switch box, install it onto the air outlet side of the indoor unit using the two holes on the front plate.

Warning **Do not install the switch box under any of the surrounding piping to avoid electrical fire or shock caused by leaking condensation.**

- Install the wiring of the switch box facedown.
- Clamp the earth and power supply wires together to provide support and relieve tension at the earth terminal (see Fig. 16).

Fig.16

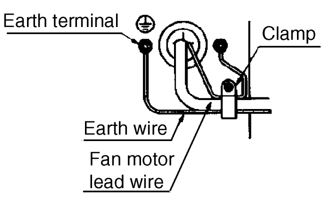
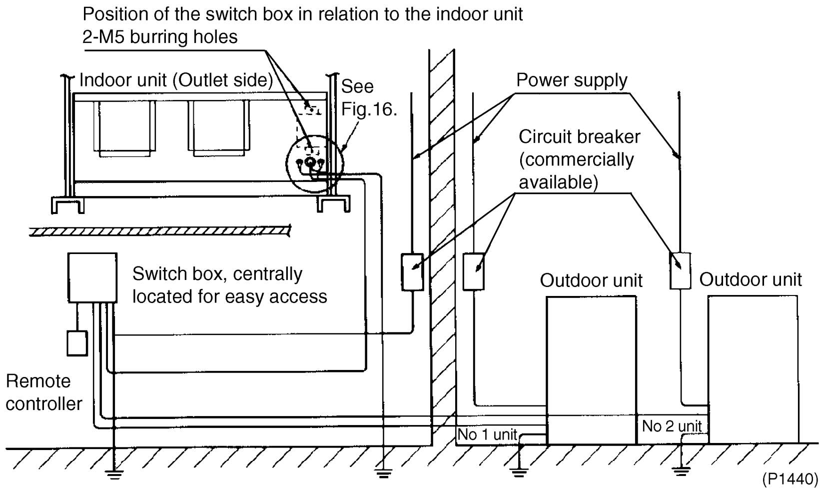


Fig.15



1.3.5 Test Operation

- Check to make sure that all installation procedures have been completed according to the installation manuals for the indoor unit, outdoor unit and the remote controller.
- Turn on the remote controller to check the rotational direction of the fan and for proper air flow. If the fan rotates in the wrong direction, charge the power phase supply connection (3 phase models).
- After connection changes or any other adjustments are made, allow the unit to run in order to confirm that it is operating property.

1.4 R71FU, 100FU, 125FU

1.4.1 Refrigerant Piping Size and Permissible Length

1. Confirm the proper refrigerant piping size as follows.

(a) Refrigerant piping size

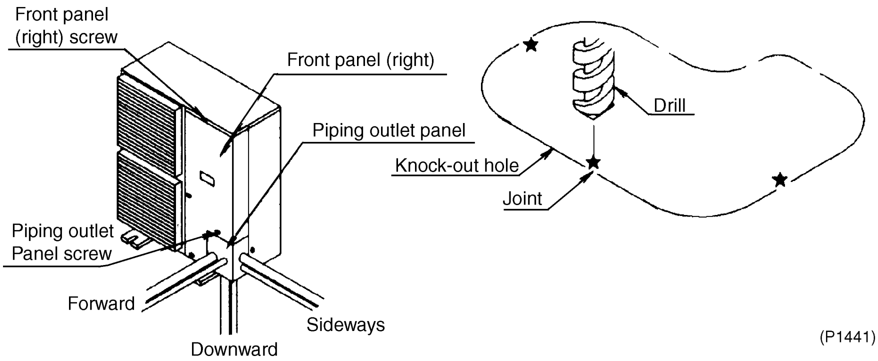
Outdoor unit	Refrigerant piping size	
	Gas pipe	Liquid pipe
71 type	ϕ15.9×t1.0	ϕ9.5×t0.8
100·125 type	ϕ19.1×t1.0	

(b) Permissible piping length

Type	Max. permissible piping length	Max. height difference
Pair type	30m	20m

1.4.2 Refrigerant Piping

- Piping can be locally extended in three directions.
- After cutting off the ★ marked area with approx. 6mm dia, drill, repeat bending the knockout area of steel plate several times and tear it off from the face frame.

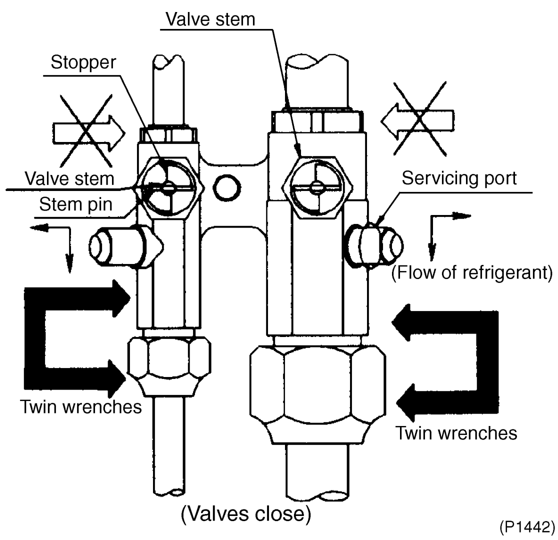


(P1441)

- Do not allow any substances other than the specified refrigerant such as air to mix into the refrigerant circuit.

Caution **<Cautions for handling Stop Valve>**

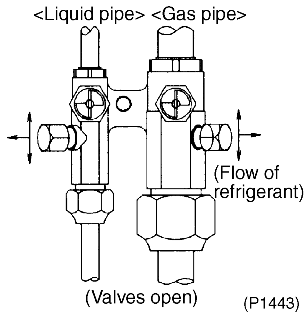
1. The stop valves for indoor-outdoor connecting piping are closed at shipment from the factory. The names of parts are as shown on the right.
2. Use two wrenches at the points indicated by the solid arrows (🡐) when loosening or tightening the flare nuts.
3. Do not apply the wrenches to the position indicated by the hollow arrows (⇍).



(P1442)

<Operation of Stop Valve>

1. Opening
(a) Turn the valve stem 1/4 turn counterclockwise, using a (–) driver.
(b) Stop when the pin hits the stopper. The valve is open.
2. Closing
(a) Turn the valve stem 1/4 turn clockwise, using a (–) driver.
(b) Stop when the pin hits the stopper. The valve is closed.



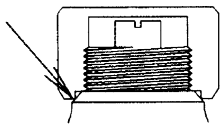
(P1443)

Cautions for Handling Valve Cover

1. The valve cover is sealed where indicated by the allow. Take care not to damage it.
2. After operating the valve, be sure to tighten the valve cover properly.
   Tightening torque : 1960-2450 N·cm (200-250 kgf·cm)

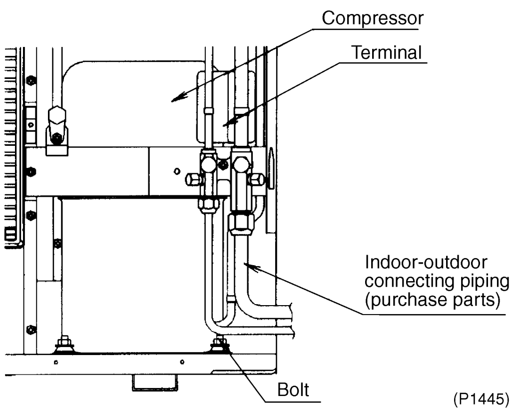
Cautions for Handling Service Port

1. Work with the charge hose with a pushbar.
2. After the work, tighten the valve cover in place.Tightening torque : 980-1470 N·cm (100-150 kgf·cm)


(P1444)

Cautions for Connecting Pipes

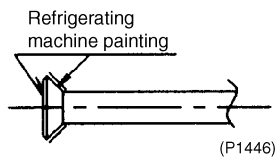
1. Make sure that the indoor-outdoor connecting pipes do not touch the terminals of the compressor.
2. The connecting pipes must not touch the bolts of the compressor.



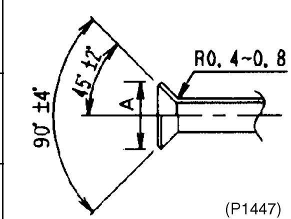
(P1445)

Cautions for Flare Connection

1. See the following table for the flare dimensions.
2. When connecting the flare nut, apply refrigerating machine oil to the flare (inside and outside) and first screw the nut 3 or 4 turns by hand.
3. See the following table for the tightening torque. (Excessive tightening could crack the flare.)
4. After completing the installation, carry out a gas leak inspection of the piping connections with nitrogen and such.

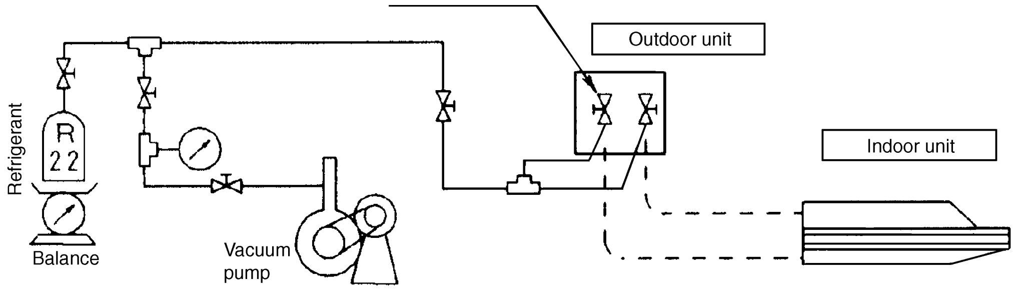


(P1446)

Piping size	Tightening torque	Flare dimensions A(mm)	Flare form
ϕ9.5	3270~3990 N·cm (333~407 kgf·cm)	12.0~12.4	 (P1447)
ϕ15.9	6180~7540 N·cm (630~770 kgf·cm)	18.6~19.0	
ϕ19.1	9720~11860 N·cm (990~1210 kgf·cm)	22.9~23.3	

1.4.3 Air Purge

1. Carry out an air purge of the refrigerant system, using a vacuum pump.

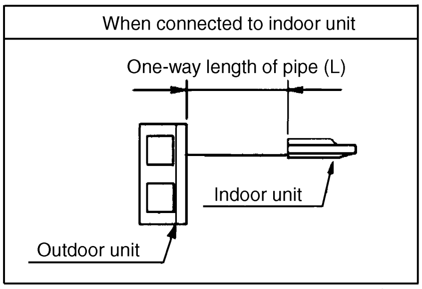


(P1448)

1.4.4 Charging of Refrigerant

- This unit requires additional charging of refrigerant according to the length of pipe connected at the site.
  Take the following steps for proper charging.
  Refer to Figure 1 for refrigerant pipe one-way length.

Figure 1



(P1449)

1. Refrigerant charge amount

Additional charging of refrigerant

(a) Select the appropriate refrigerant charging amount from Table 1 and charge the refrigerant.

(b) Mark circle on the selected amount in the tabies which in a nameplate affixed inside the front panel (right) for future servicing.

Table 1 Additional charging amount <unit : kg>

The maximum allowable pipe length is 30 meters.

Length of pipe connected (L)	5m	10m	15m	20m	25m	30m
Additional charging amount	—	0.13	0.25	0.38	0.50	0.63

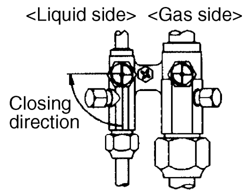
2. Recharging refrigerant

(a) When the entire refrigerant pipe length is within 5 meters, charge the refrigerant on accordance with the amount mentioned on the nameplate, and when the pipe length exceeds 5 meters, the charging amount is an addition of the amount stated on the nameplate and the additional charging amount.

3. Pump down operation method

Take the following steps to perform the pump down operation.

Procedure	Precautions
1. Connect a pressure gauge to the service port of the stop valve.	Carry out an air purge of the charge hose.
2. Perform fan operation by the remote controller.	Make sure that the liquid-side and gas-side stop valves are fully open.
3. Perform cooling operation by the remote controller	Check that the compressor and outdoor fan are operating.
4. Run the unit for one minute until the operation stabilizes.	—
5. Close the liquid-side stop valve fully.	If valve is not fully closed it could cause burn-out of the compressor.
6. After the pressure gauge indication has dropped to 0 kgf/cm²G, close the gas stop valve fully and press the stop button on the remote controller.	—

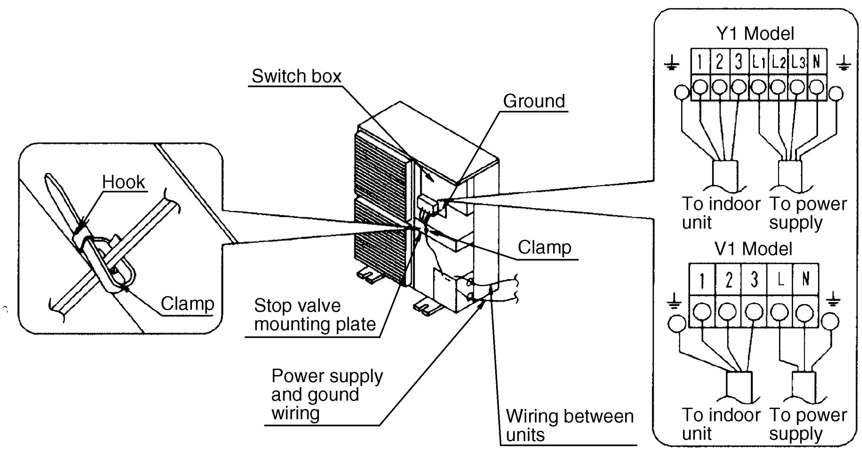


(P1450)

This is the end of pumping down operation.

1.4.5 Electrical Wiring

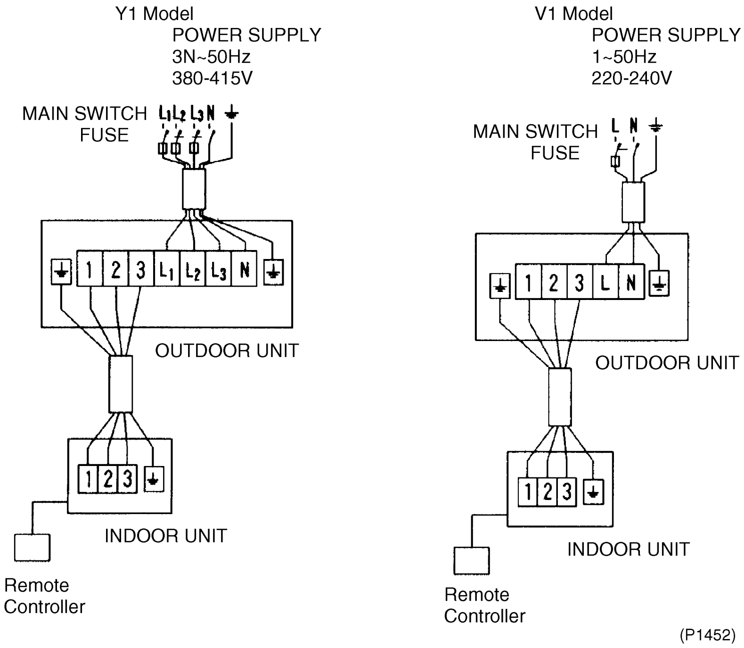
- Electrical wiring must be carried out by qualified personnel. Warning
- Power supply must be cut off to everything that may come in touch with the terminals. Warning
- Be sure to ground the air conditioner. Caution
- Do not connect the earth wire to a gas pipe, water pipe, lighting conductor or telephone earth wire. Caution
- Use only copper wires. Caution
- The wiring between the indoor unit and outdoor unit must be for 220V.
- Do not turn on the main switch until all the wiring is completed.
- The resistance of the grounding must not exceed 500 ohms.
- When performing electrical wiring, refer also to the wiring diagram affixed to the unit.
- Use the specified wires and fix them with clamps so that no external forces act on the terminals. For clamping, push the tail end of the clamp to loosen it, pass the wires through it, them fasten the clamp.
- Clamp the wiring as shown below, taking care that the wires do not touch the piping (especially high-pressure piping).
- Never connect the neutral wire to the "L1", "L2" or "L3" terminal. The neutral wire must be connected to the "N" terminal. (only Y1 models)
- Never squeeze extra wires into the unit.
- When leading out the wires to the front or side, you can use a wire conduit passing through the knock-out hole (ϕ34mm).
- Form the wires and fix the cover firmly so that the cover may be fit in properly.



(P1451)

<How to Connect the Power Supply and Wire between Units>

1. For details on the wiring of the indoor unit and wiring between units, refer to the Installation Manual of the indoor unit.



Specifications of standard wiring components

Model	Power supply			Wire type of wiring between the units. (★)
	Field fuse	Wire type (★)	Size	
R71FUY1	15A	H05VV-U5G	Wiring size must comply with the applicable local and national code.	H05VV-U4G2.0
R100FUY1	15A	H05VV-U5G		H05VV-U4G2.0
R125FUY1	15A	H05VV-U5G		H05VV-U4G2.0
R71FUV1	30A	H05VV-U3G		H05VV-U4G2.0
R100FUV1	30A	H05VV-U3G		H05VV-U4G2.0

- Instead of fuse, use circuit breaker.

1.4.6 Test Operation

- Be sure to fully open the liquid-side and gas-side stop valves. If the protective device of the compressor is triggered as a result of operation with the stop valves closed, it may take several hours before operation can be resumed. ⚠ Caution
- For details on test operation, refer to the Installation Manual of the indoor unit.

1.5 RU06K

1.5.1 Refrigerant Pipe Size and Allowable Pipe Length

1. Refrigerant pipe size

Outdoor unit	Refrigerant pipe size	
	Gas pipe	Liquid pipe
RU06KY1	ϕ19.1×t1.0	ϕ19.1×t0.8
RU06KTAL		

Note: ■ Use the material below for piping. Wrought copper (having minimum copper content of 99.85%) : ISO1336

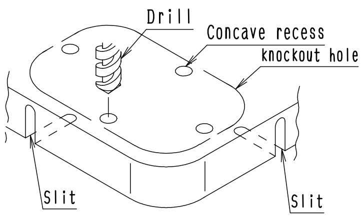
2. Allowable pipe length

	Maximum allowable piping length (Parenthesized figure represents equivalent length)	Maximum allowable height difference
Pair-type	50m	30m

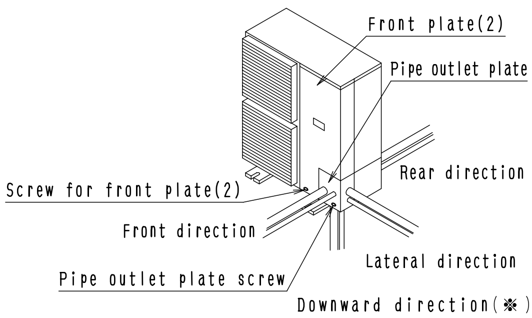
1.5.2 Precautions on Refrigerant Piping

Field pipes can be installed in four directions.

- ■ Do not allow air other than the specified refrigerant to mix in during the refrigerating to mix in during the refrigerating cycle.
- ■ To install the connecting pipe to the unit in downward direction, make a knockout hole by penetrating the concave recesses (four locations) using a ϕ6mm drill.

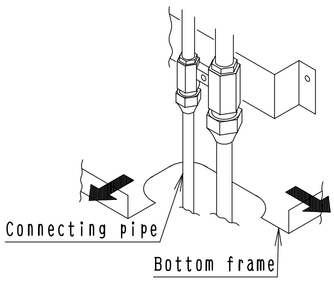


(P1454)



(P1453)

- ■ By cutting the slit (2 places), installation will be possible as shown in the figure below. (Please use a hacksaw when cutting the slit.)



(P1455)

<Precautions for handling pipe stop valves>

The names of the parts necessary for handling the pipe stop valves for the indoor and outdoor units are described in Fig. 5. The valves are closed before shipment.

- Tighten and loosen the flare nut by grasping the portions indicated by the black arrows in the figure with two spanners. Do not grasp the portions indicated by the white arrows with a two spanners.

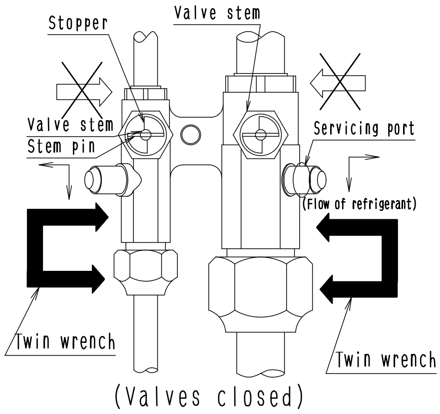


Fig. 5

(P1456)

Operating stop valve

To open :
1. Turn the valve stem 1/4 turn counterclockwise with a screwdriver.
2. Stop turning the stem at the point where the stem pin comes in contact with the stopper. Now the valve is opened. (Refer to Fig. 6)

To close :
1. Turn the valve stem 1/4 turn clockwise.
2. Stop turning the stem at the point where the stem pin comes in contact with the stopper. Now the valve is closed. (Refer to Fig. 5)

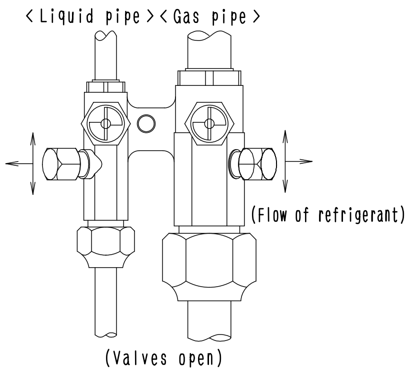
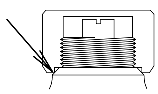


Fig. 6

(P1457)

<Precautions for handling valve cap>



(P1458)

1. A seal is attached to the point indicated by the arrow. Take care not to damage it.
2. Be sure to tighten the valve cap securely after operating the valves.Tightening torque : 1960-2450 N·cm (200-250 kgf-cm)

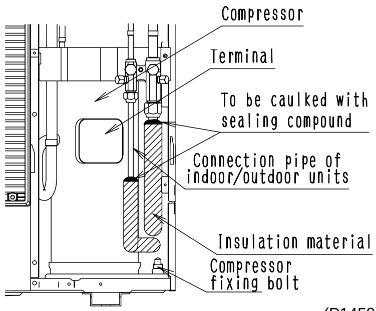
<Precautions for handling servicing port>

1. Use a push-rod-provided charging hose for operation.
2. Be sure to tighten the valve cap securely after operation. Tightening torque : 980-1470 N·cm (100-150 kgf-cm)

<Precautions for connecting pipes>

Avoid the connection pipes of indoor and outdoor units from getting in contact with the terminal of the compressor. Adjust the height of the insulation material on liquid pipe when it has the possibility of getting in contact with the terminal. Also make sure that the connecting piping does not touch the mounting bolt of the compressor.

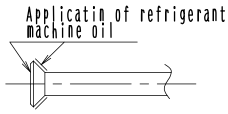
If the outdoor unit is installed higher than the indoor unit, the condensate from a stop valve may run down along the piping through the clearance between insulation and piping into the indoor unit. Under such conditions, an appropriate measure must be taken to prevent the condensate from running down into the indoor unit, for example, the clearance between the pipe and the insulation must be caulked with sealing compound.



(P1459)

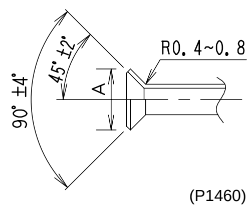
<Precautions for connecting pipes>

- Please refer to the Table 1 for the dimensions for processing flares.
- When connecting the flare nut, coat the flare both inside and outside with refrigerating machine oil and initially tighten by hand 3 or 4 turns before tightening firmly.
- Be sure to use both a spanner and torque wrench together when connecting or disconnecting pipes to/from the unit.
- Please refer to the Table 1 for the tightening torque. (Too much tightening will end up in splitting of the flare.)



(P1461)

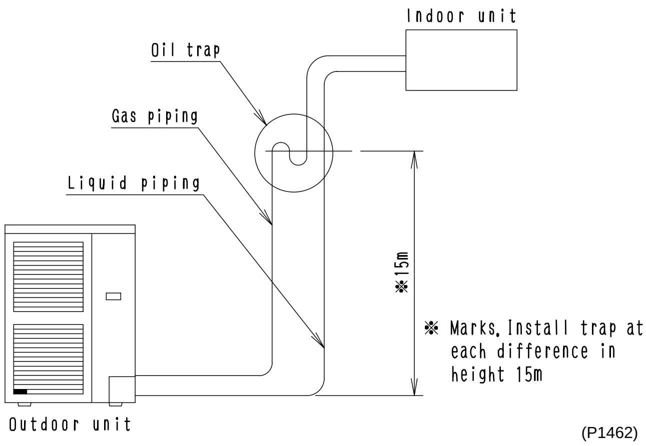
Table 1

Piping size	Tightening torque	A dimensions for processing flares (mm)	Flare shape
ϕ9.5	3270~3990 N·cm (333~407 kgf·cm)	12.0~12.4	 (P1460)
ϕ19.1	9720~11860 N·cm (990~1210 kgf·cm)	22.9~23.3	

- **Necessity of a trap**

Since there is fear of the held inside the riser piping flowing back into the compressor when stopped and causing liquid compression phenomenon, or cases of deterioration of oil return, it will be necessary to provide a trap at an appropriate place in the riser gas piping.

- **Trap installation spacing**



(P1462)

Note: A trap is not necessary when the outdoor unit is installed in a higher position than the indoor unit.

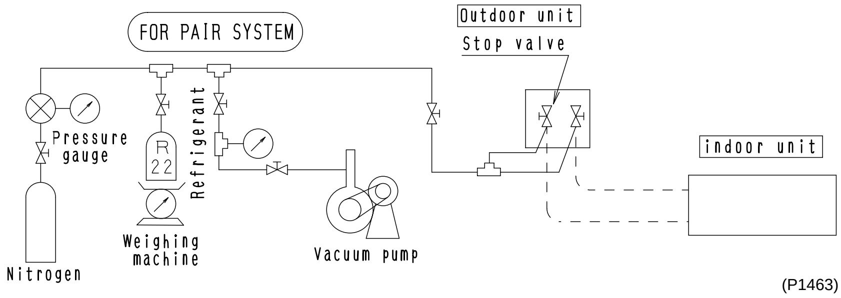
1.5.3 Evacuating

The units were checked for leaks by the manufacturer.

The refrigerant lines fitted in site are to be checked for leaks by the fitter.

Leak test

1. Evavcuate the pipes and check vacuum. (No pressure increase for 1 minute.)
2. Charge Nitrogen gas.
3. Conduct leak test by applying soap water, etc. to the connecting part of the pipes.
4. Discharge Nitrogen.
5. Evacuate and check vacuum again.
6. open the stop valve and inject the refrigerant into the refrigerant pipe and into the indoor unit.
7. Leak test must satisfy the standard pr. EN378-7.

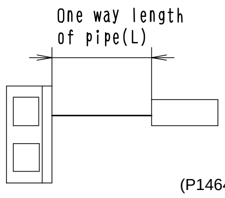


(P1463)

1.5.4 Charging Refrigerant

This unit requires additional charging of refrigerant according to the length of pipe connected at the site.

Take the following steps for proper charging.



(P1464)

1. Additional charging of refrigerant

Select the appropriate refrigerant charging amount from Table 2, 3 and charge the refrigerant. Fill out the notice plate attached in the rear of the front plate (2) for future servicing.

table 2 Additional charging refrigerant amount

Additional charging refrigerant amount [ ] kg = (Piping length(L) [ ] m − 5m) × 0.025kg/m

(P1465)

<Precaution>

- Contact your Daikin dealer when installing the unit using pipes of 3m or less.

2. Complete charging of the refrigerant

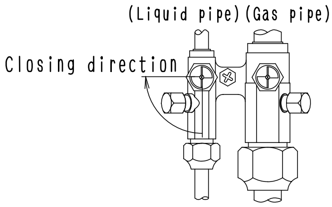
When the entire refrigerant pipe length is within 5 meters, charge the refrigerant in accordance with the amount mentioned in the nameplate, and when the pipe length exceeds 5 meters, the charging amount mentioned in the nameplate and that required for additional charging are to be totaled as the net charging amount.

3. Precautions for pumping-down operation

The outdoor unit is equipped with a low-pressure switch to protect the compressor. Take the following steps to perform the pumping-down operation.

Caution **Never short-circuit the low-pressure switch in this operation.**

Procedure	Precautions
1. perform cooling operation by the remote controller.	Confirm that stop valves both on the liquid and gas side are open.
	Check that the compressor and outdoor fan are operating.
2. Continue operation for 1 min. until operation condition stabilizes.	—
3. Close the liquid-side stop valve fully.	Insecure closing of the valve may result in burning of the compressor.
4. When the low-pressure switch is activated, the unit stops working. At this time, close the stop valve on the gas side.	—
5. Turn off the remote controller.	—



(P1466)

1.5.5 Electrical Wiring Work

- All wiring must be performed by an authorized electrician.
- All components procured on the site and all electric construction should comply with the applicable local and national codes.
- Use copper conductors only.
- Use a ground wire of 100Ω or less.
- Fix cables as shown in Fig. 7 so that cables do not make contact with the pipes (especially on high pressure side.)
- For Y1 models
  Make sure to connect power supply cables in normal phase.
  If connected in reverse phase, the equipment cannot operate.
  Change any two of the three power supply cables (L1, L2, L3) to correct phase.
  (If the contact in the magnetic switch should be forcibly turned on while the equipment is inoperative, the compressor will be damaged by a fire. Never try to forcibly turn on the contact.)
- Never squeeze bundled cables into a unit.
- When cables are routed from the front, sides, or back of the unit, protection sleeves for the conduits (PG-insertions) can be inserted at the installation holes (ϕ34, ϕ27) (Refer to Fig. 8)
- Follow the electric wiring diagram on the nameplate for electrical wiring works.
- Never bundle and push excess wiring into the unit.
- Keep wires flat so that they do not push the cover open. Install the cover securely.
- Be sure to use a dedicated power supply.
- Do not share a common sourse with other equipment.

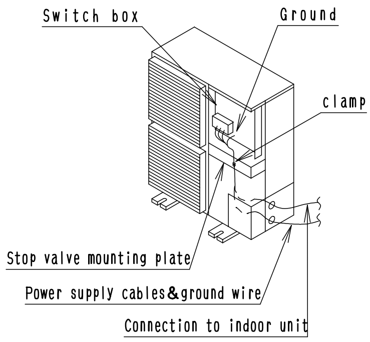


Fig. 7
(P1467)

<Wiring of power supply and the units>
Refer to installation manual attached to the indoor unit for wiring of indoor units, etc.
Attached main switch and fuse to the power supply line.

<Wiring of power supply and the units>
Refer to the installation manual attached to the indoor unit for wiring of indoor units, etc.
Attach main switch and fuse to the power supply line.

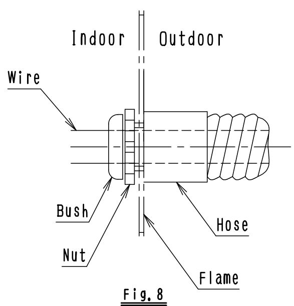
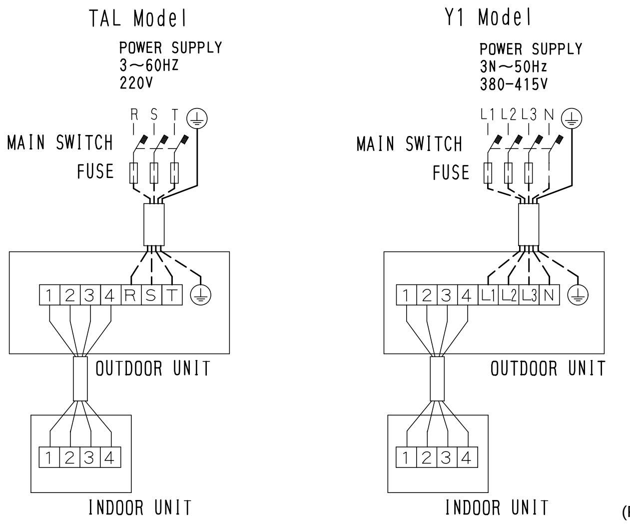


Fig. 8
(P1468)

Pair system



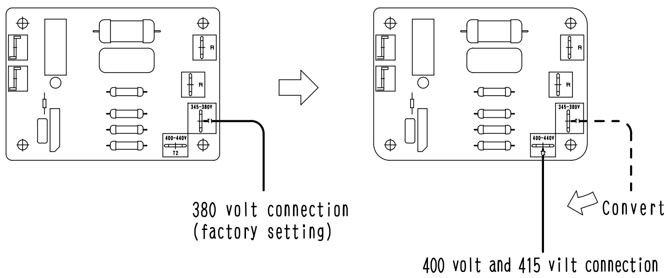
(P1469)

Model	Power supply			Wire type of wiring between the units. (★)
	Field fuse	Wire type (★)	Size	
RU06KY1	25A	H05VV-U5G	Wiring size must comply with the applicable local and national code.	H05VV-U4G2.0
RU06KTAL	45A	H05VV-U4G		H05VV-U4G2.0

★ Only in protected pipes, use H07RN-F when protected pipes are not used.

Caution **(Y1 models only)**

- Make sure that the phase reversal protector’s terminal connection is converted when switching to a 400volt or 415 volt connection.



(P1470)

- Failing to convert to the proper voltage will cause serious damage to the unit.

1.5.6 Test Operation

For the test run procedure, refer to the indoor unit installation manual.

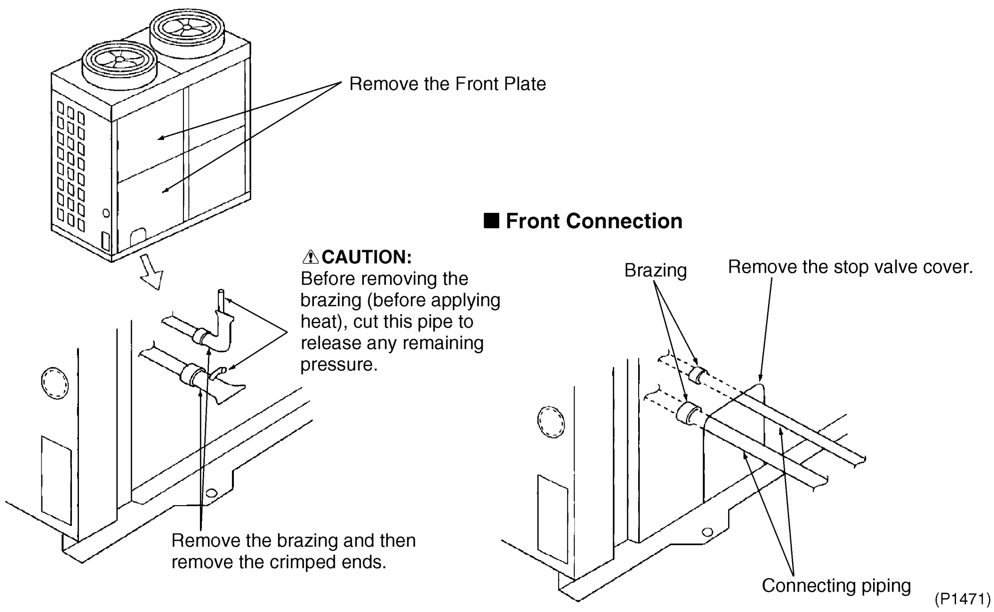
1.6 R08K, R10K

1.6.1 Refrigerant Piping Work

- The following are material specifications for the piping.
  Refrigerant piping : Seamless copper piping that has undergone phosphoric acid deoxidization.
  Size : See figure below.

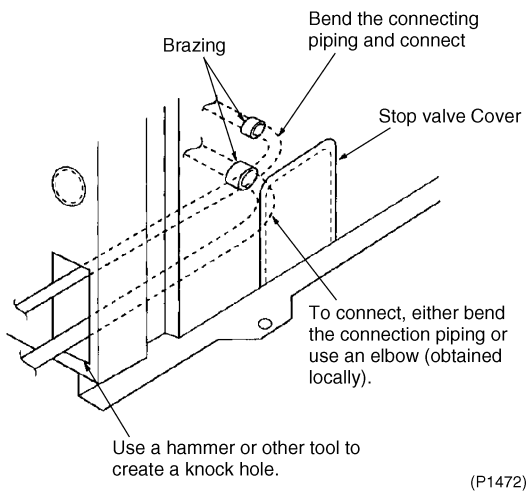
Model	Refrigerant Piping Size		Maximum Allowable Pipe Length	Figures in Parenthesis Represent Equivalent Length	Maximum Allowable Height Difference
	Gas Pipe OD × T (Min.)	Liquid Pipe OD × T (Min.)			
FD08K + RU08K	ϕ25.4×1.2mm	ϕ12.7×0.9mm	50m	70m	30m
FD10K + RU10K	ϕ31.8×1.4mm	ϕ15.9×1.0mm			

- As shown in the below, the piping can be connected from either the front, side or bottom of the unit.

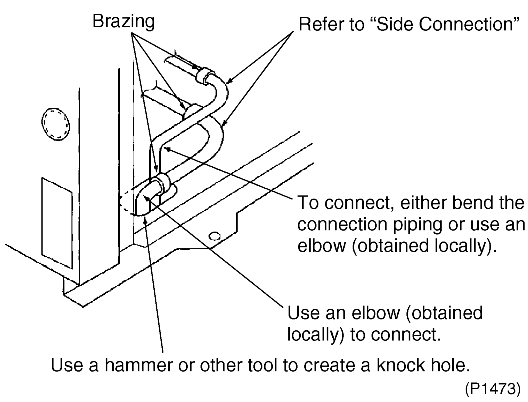


Note : Adjust connecting piping on site.

- **Side Connection**



- **Bottom Connection**



- Always completely heat insulate the gas and liquid piping.
- Use heat insulators capable withstanding 80°C for both the gas and liquid side.

1.6.2 Air Purge and Charging with Refrigerant

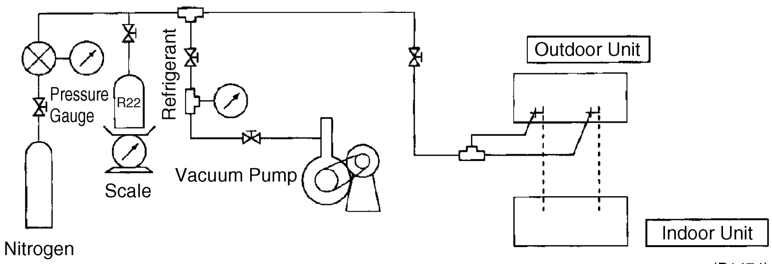
Caution **This model is not charged with refrigerant at the factory.**

Warning **Always charge the unit with refrigerant. Failure to do so will cause damage to the compressor. Do not charge the compressor with refrigerant while it is operating.**

- Perform an air purge of the system with a vacuum pump.
- The unit has been checked for leaks by the manufacturer.
- Refrigerant piping installed on site must be check for leaks by the installer.

- **Leak test**

1. Evacuate the piping and check the vacuum. (There should be no pressure increase for one minute.)
2. Charge the system with nitrogen gas.
3. Conduct a leak test by apply soapy water to the joints of the piping.
4. Discharge nitrogen.
5. Evacuate the piping and check the vacuum again.
6. Charge with refrigerant.



(P1474)

- Calculate the amount of refrigerant charge using the information provided below. (When piping is less than 5 meters in length.)

RU08K (Y1·TAL)	5.0kg (Basic Charge)
RU10K (Y1·TAL)	6.1kg (Basic Charge)

(When piping is more than 5 meters in length.)

RU08K (Y1-TAL)

Total Refrigerant Amount (kg)		Basic Charge Amount (kg)		Additional Charge Amount (kg/m)		Total Piping Length (m)	
	=		+	0.05	+ (		–5 meters)

RU10K (Y1-TAL)

Total Refrigerant Amount (kg)		Basic Charge Amount (kg)		Additional Charge Amount (kg/m)		Total Piping Length (m)	
	=		+	0.06	+ (		–5 meters)

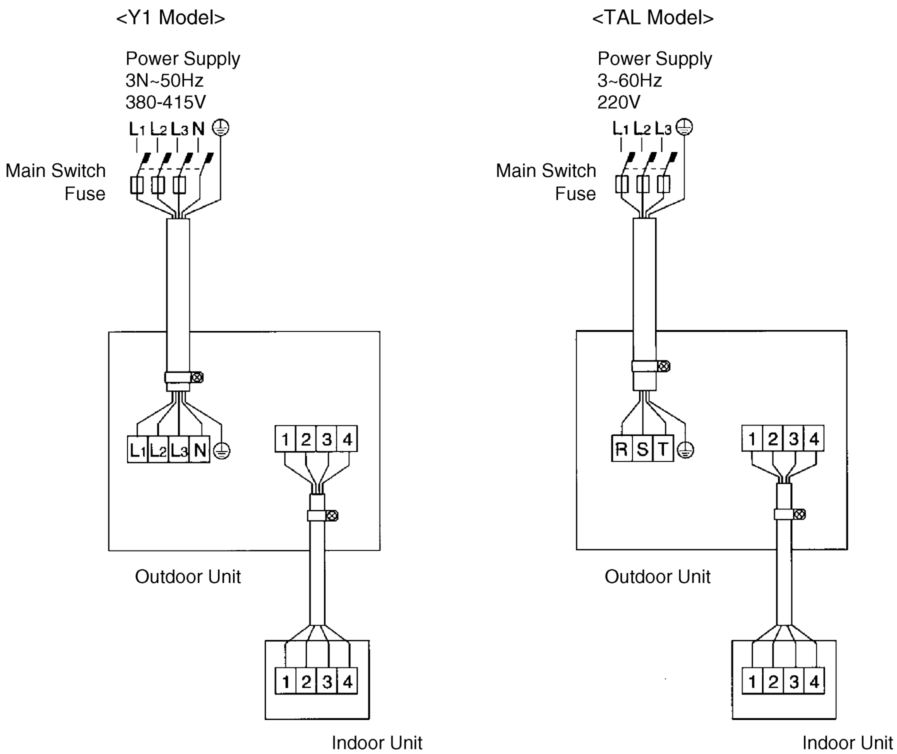
- Always charge with the amount of refrigerant calculated above.

1.6.3 Electric Wiring Work

- All electrical wiring components which are to be obtained locally must meet or exceed the applicable standards for the country or region in which the unit is being installed.
- Only use copper conductors.
- Refer to the “Wiring Diagram” on the unit when installing.
- All electrical work must be performed by appropriately certified electricians.
- The schematic diagram of the wiring provided here is only a guideline and does not provide the detailed information required for proper installation.
- The power line for the unit must have a switch with a fuse or breaker that meets applicable local standards.
- Wire connections must be tight, but not forced. Dress the wiring so that the covers and related parts will not come loose. Poorly connected and/or poorly routed wiring can cause overheating, electrical shock and/or fire.

- **Wiring of power supply for the units**
- Refer to the Installation Manual provided with indoor unit.

Caution **The power line for the unit must have a switch with a fuse or breaker that meets applicable local standards.**

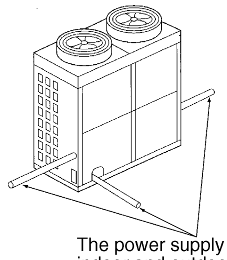


(P1477)

Caution **Clamp the power supply wiring as well as the wiring between the indoor and outdoor units with resin clamp material. (Be sure to clamp the ground wire.)**

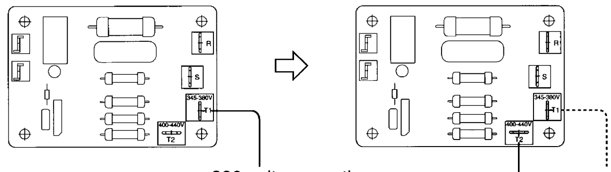
Model	Power Supply			Wiring Between Units	
	Field Fuse	Wire Type	Size	Wire Type	Size
RU08KY1	30A	H05VV-U5G	All electrical wiring components which are to be obtained locally must meet or exceed the applicable standards for the country or region in which the unit is being installed.	UL1015 AWG18 or Equivalent	0.75mm² each
RU10KY1	40A				
RU08KTAL	50A	H05VV-U4G			
RU10KTAL	60A				

- As shown in the figure below, the wiring can be connected from the front, left or right side of the unit.



(P1478)

Caution **(Y1 models only)**
Make sure that phase reversal protector’s terminal connection is converted when switching to a 400 volt or 415 volt connection.



(P1479)

- Failing to convert to the proper voltage will cause serious damage to the unit.

1.6.4 Test Operation

- Only perform test operation after charging the unit with refrigerant. Failure to do so will cause damage to the compressor.

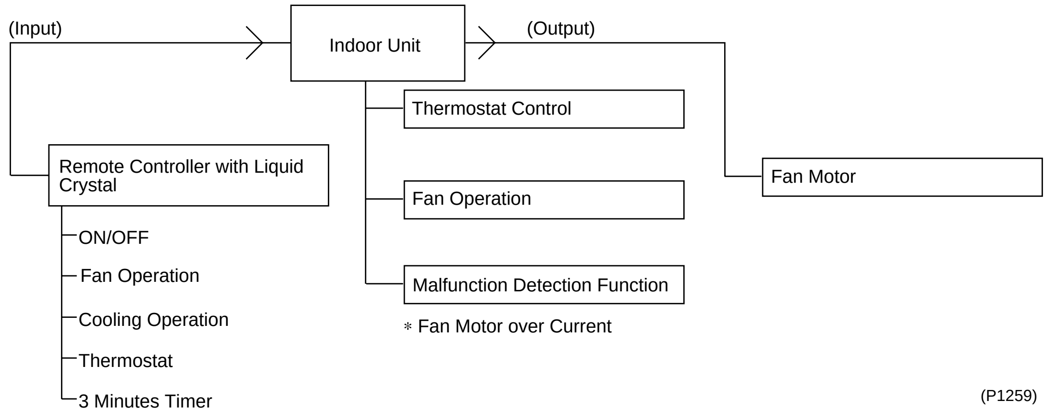
Warning Details of the test operation are provided in the Installation Manual for the indoor unit.

Part 6
Function and Operation

1. Function Outline

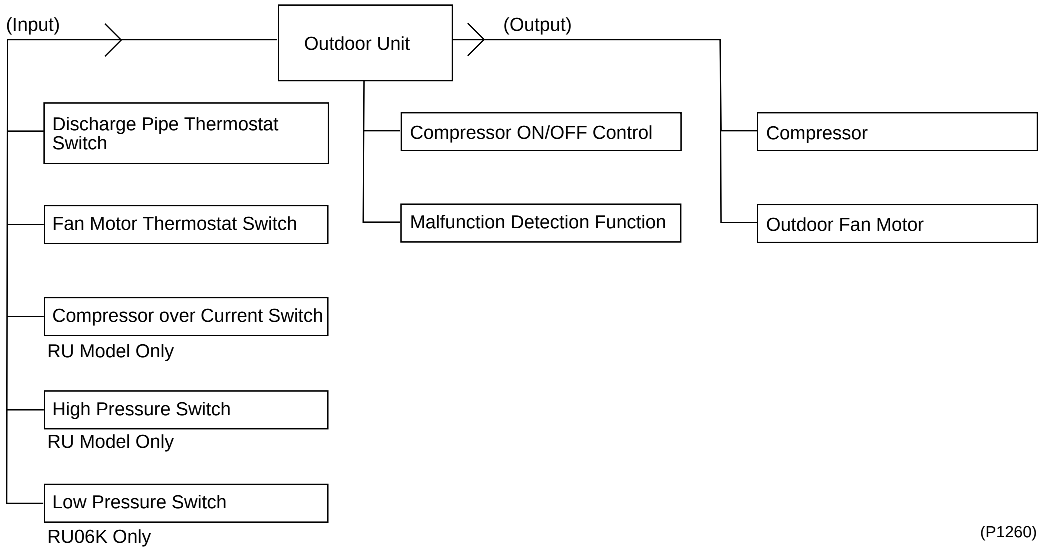
1.1 Indoor Unit

FD-K Series



1.2 Outdoor Unit

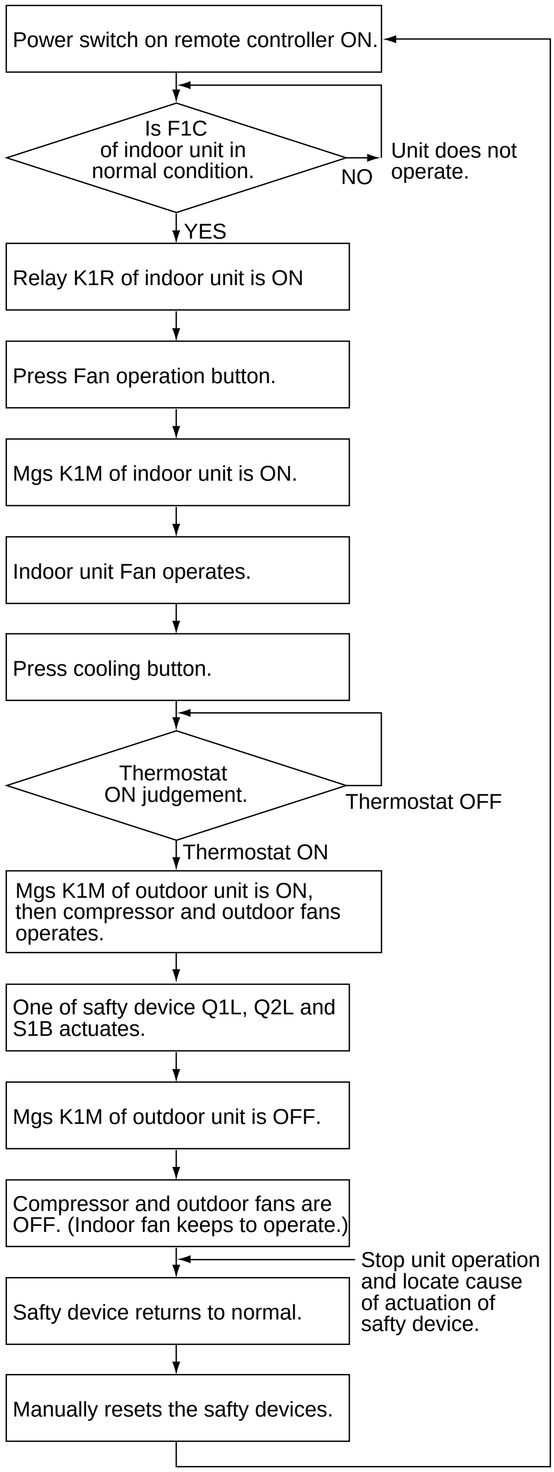
R Model



2. Operation Flow Chart

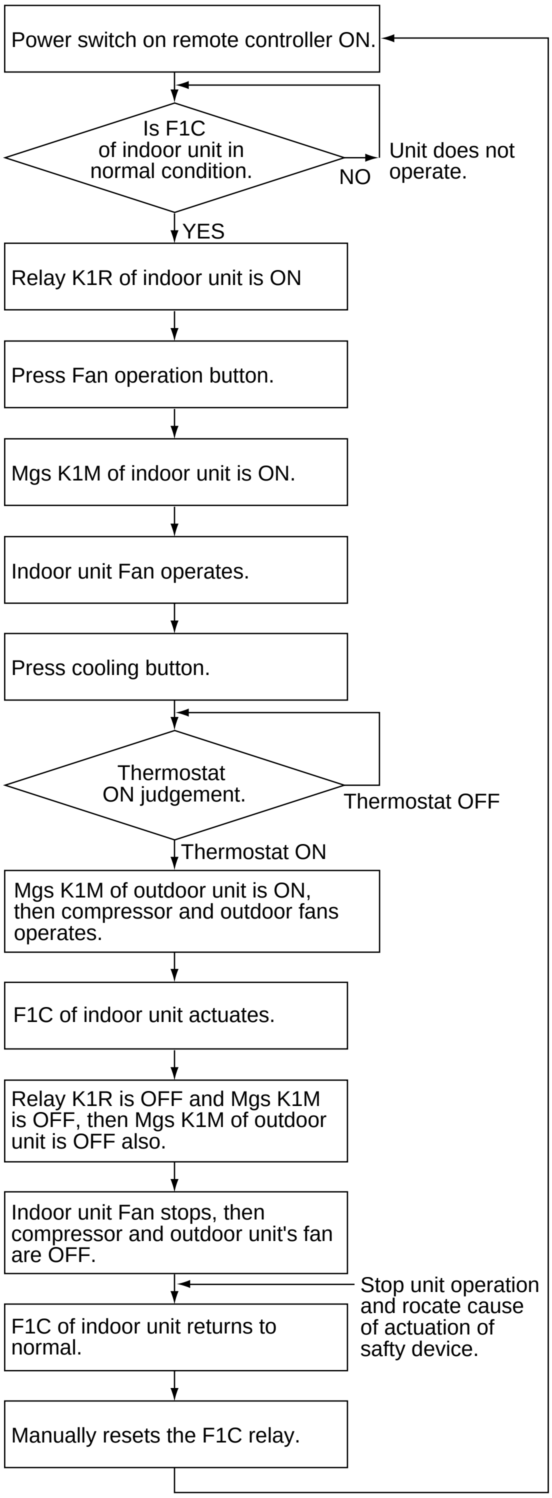
2.1 Operation Flow Chart (FD-K+R-FU)

<Case 1>



(P1261)

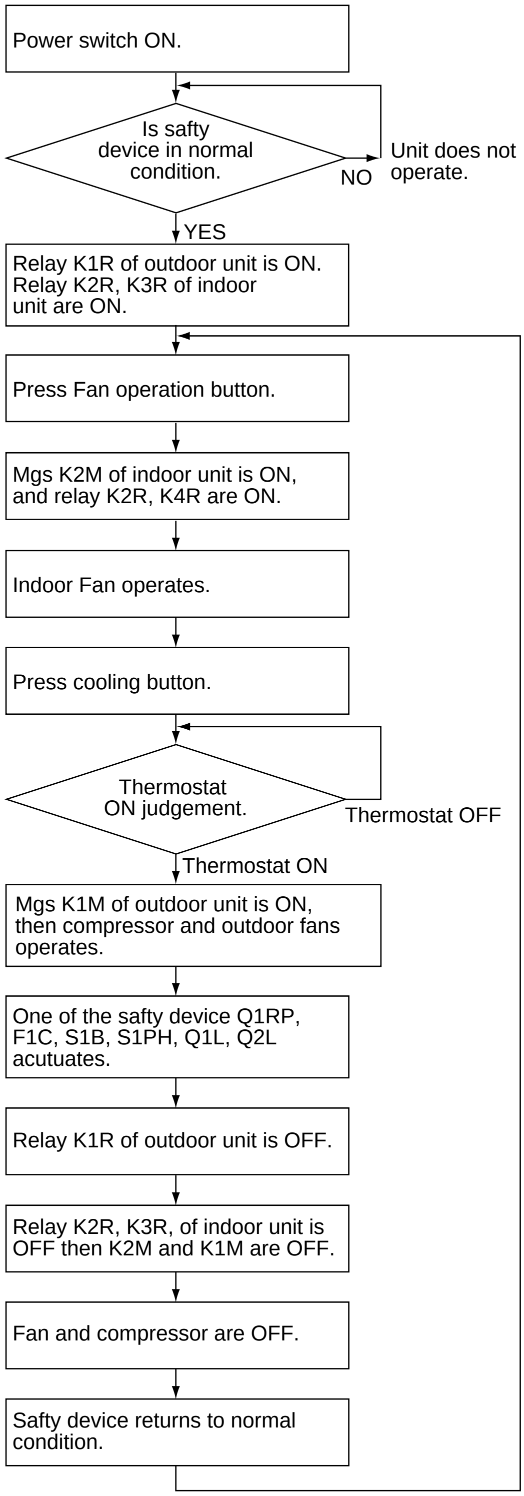
<Case 2>


Power switch on remote controller ON.
Is F1C of indoor unit in normal condition.
NO
Unit does not operate.
YES
Relay K1R of indoor unit is ON
Press Fan operation button.
Mgs K1M of indoor unit is ON.
Indoor unit Fan operates.
Press cooling button.
Thermostat ON judgement.
Thermostat OFF
Thermostat ON
Mgs K1M of outdoor unit is ON, then compressor and outdoor fans operates.
F1C of indoor unit actuates.
Relay K1R is OFF and Mgs K1M is OFF, then Mgs K1M of outdoor unit is OFF also.
Indoor unit Fan stops, then compressor and outdoor unit's fan are OFF.
Stop unit operation and rocate cause of actuation of safty device.
F1C of indoor unit returns to normal.
Manually resets the F1C relay.
(P1262)

2.2 Operation Flow Chart (FD-K+RU-K)

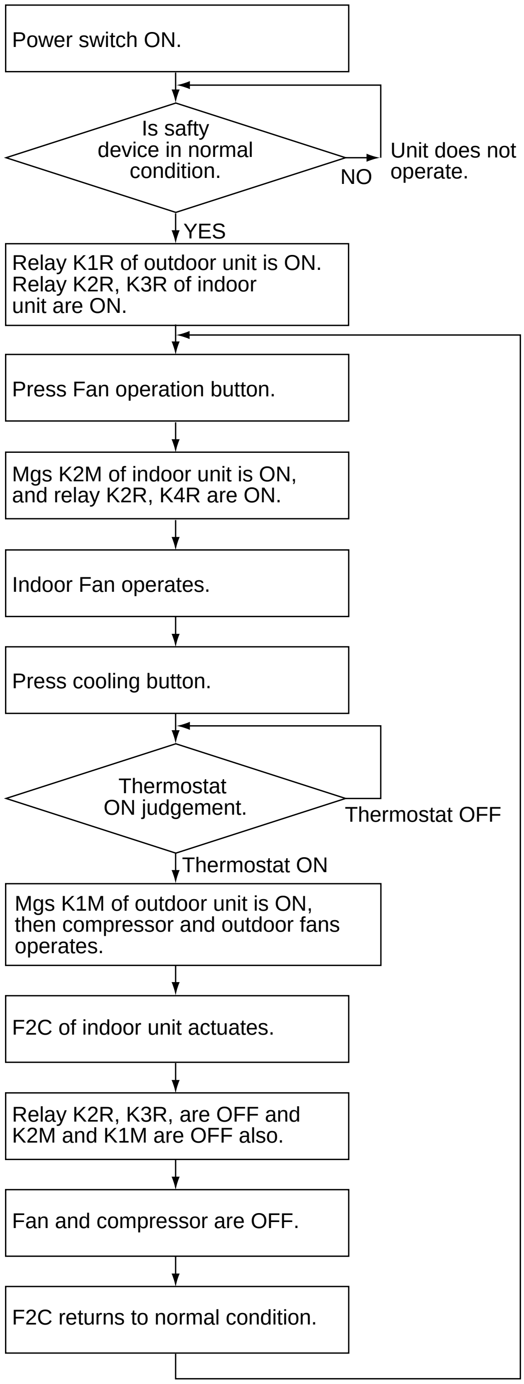
- ∗ This explanation is for FD06~10K+RU06~10K.
  Siwilar control is applied to FD15K/FD20K but two step thermostat controls two outdoor units.

<Case 1>



(P1263)

<Case 2>


Power switch ON.
Is safty device in normal condition.
NO
Unit does not operate.
YES
Relay K1R of outdoor unit is ON. Relay K2R, K3R of indoor unit are ON.
Press Fan operation button.
Mgs K2M of indoor unit is ON, and relay K2R, K4R are ON.
Indoor Fan operates.
Press cooling button.
Thermostat ON judgement.
Thermostat OFF
Thermostat ON
Mgs K1M of outdoor unit is ON, then compressor and outdoor fans operates.
F2C of indoor unit actuates.
Relay K2R, K3R, are OFF and K2M and K1M are OFF also.
Fan and compressor are OFF.
F2C returns to normal condition.

(P1264)

3. Electric Function Parts

3.1 Indoor Unit

3.1.1 FD-KY1

Capacity	03	04	05
Remote Controller	KRC47-3, KRC47-5 (Digital Type)		
Fan Motor	TFO-K 3ϕ 380/415V 4P 0.4kW		TFO-K 3ϕ 380/415V 4P 0.75kW
Fan Motor Magnetic Switch	CLK15JTH40-P6 220V		CLK15JTH40-P6 220V
Fan Motor Over Current Relay	1.2A		1.8A

Capacity	06	08	10
Remote Controller	KRC47-3, KRC47-5 (Digital Type)		
Fan Motor	TFO 3ϕ 380/415V 4P 0.75kW	TFO-K 3ϕ 380/415V 4P 1.5kW	
Fan Motor Magnetic Switch	CLK-15JTH40-P6 220V	CLK-15JT40-P6 220V	
Fan Motor Over Current Relay	1.8A	3.6A	

3.1.2 FD-KVAL

Capacity	03	04
Remote Controller	KRC47-3, KRC47-5 (Digital Type)	
Fan Motor	EFOUP 1ϕ 220/240V 4P 0.4kW	
Fan Motor Magnetic Switch	CLK15JTH40-P12 220V	
Fan Motor Over Current Relay	3.2A	

3.1.3 FD-KTAL

Capacity	05	06	08	10
Remote Controller	KRC47-3, KRC47-5 (Digital Type)			
Fan Motor	TFO 3ϕ 220V 4P 0.75kW		TFO-K 3ϕ 220V 4P 1.5kW	
Fan Motor Magnetic Switch	CLK-15HTH40-P4B 220V	CLK-15JTH40-P6 220V	CLK-15JT40-P6 220V	
Fan Motor Over Current Relay	3.2A	3.2A	6.0A	

3.1.4 FD-KY1

Capacity	15	20
Remote Controller	KRC47-3 (1 Step Thermostat), KRC47-5 (Digital Type) KRC17-2B (2 Step Thermostat) + KTA19A1*	
Fan Motor	TFO 3ϕ 380/415V 50Hz 4P 2.2kW	TFO 3ϕ 380/415V 50Hz 4P 3.75kW
Fan Motor Magnetic Switch	CLK-15JT40-P6 240V	CLK-15JT40-P6 240V
Fan Motor Over Current Relay	5.0A	8.0A

* KTA19A1 : 3 minutes guard timer

3.1.5 FD-KTAL

Capacity	15	20
Remote Controller	KRC47-3 (1 Step Thermostat), KRC47-5 (Digital Type) KRC17-2B (2 Step Thermostat) + KTA19A1*	
Fan Motor	TFO 3ϕ 220V 60Hz 4P 2.2kW	TFO 3ϕ 220V 60Hz 4P 3.75kW
Fan Motor Magnetic Switch	CLK-15JT40-P6 220V	HOE-20F-TRA1C 220V
Fan Motor Over Current Relay	9.2A	14A

* KTA19A1 : 3 minutes guard timer

3.2 Outdoor Unit

3.2.1 R~FU

		R71FUY1	R71FUVAL
M1C	Compressor	H23A35QDBEA	H23A35QABCA
K1M	Magnetic Switch	MUF10-4	MUF20D
M1F	Outdoor Unit Fan (Upper)	50W	80W
M2F	Outdoor Unit Fan (Lower)	—	
Q1L Q2L	Outdoor Unit Fan Motor Safety Thermostat	OFF : 135±5°C ON : 86±15°C	
C1R	Capacitor for MF1	4µF	
C2R	Capacitor for MF2	—	
S1B	Temperature Switch (For Discharge Pipe)	A-UT12-3515K OFF : 135±2.5°C / ON : 115±15°C	
K1S	Starting Relay	—	128466-2875AN
C3R	M1C Capacitor	—	35µF
C4R, C5R	Starting Capacitor	—	80µF+80µF

		R100FUY1	R100FUVAL	R125FUY1	R125FUTAL
M1C	Compressor	H23A46QDB EA	H23A46QAB CA	H23A56QDB EA	H23A62QDB LA
K1M	Magnetic Switch	MUF10-4	MUF20D	MUF10-4	MUF20D
M1F	Outdoor Unit Fan (Upper)	75W	90W	75W	90W
M2F	Outdoor Unit Fan (Lower)	35W	45W	60W	80W
Q1L Q2L	Outdoor Unit Fan Motor Safety Thermostat	OFF : 135±5°C ON : 86±15°C			
C1R	Capacitor for MF1	4µF			
C2R	Capacitor for MF2	4µF			
S1B	Temperature Switch (For Discharge Pipe)	A-UT12-3515K OFF : 135±2.5°C / ON : 115±15°C			
K1S	Starting Relay	—	128466-2875AN	—	—
C3R	M1C Capacitor	—	40µF	—	—
C4R, C5R	Starting Capacitor	—	65µF+80µF	—	—

3.2.2 RU-KY1

Capacity		RU06KY1	RU08KY1	RU10KY1
M1C	Compressor	JT200BYE 3Ph 380-415V 50Hz	JT265D-P1YE 3Ph 380-415V 7.5kW	JT335D-P1YE 3Ph 380-415V 9kW
K1M	Magnetic Switch	HOE26F-TRA1 220V	HOE-35F-TRA1 220V	CLK-50JT-P12 220V
F1C	Over Current Relay	15A	18A	24A
M1F	Fan Motor (Upper)	EP-NOT 1Ph 220-240V 6P 85W	CCW681600 1Ph 220-240V 6P 230W	
M2F	Fan Motor (Lower)	EP-NOT 1Ph 220-240V 6P 65W	CCW681800 1Ph 220-240V 6P 190W	
	Fan Motor Protection Thermostat	OFF: 135±5°C ON: 120°C	OFF: 135±5°C ON: 86±15°C	
C1R	Fan Motor Capacitor	6μF, 400VAC	12μF, 400VAC	
C2R	Fan Motor Capacitor	6μF, 400VAC	12μF, 400VAC	
Q1RP	Reverse Phase Protector	RPJ-400V		
S1B	Thermistor Switch (Discharge Pipe)	UT12-3515K OFF: 135±2.5°C ON: 115±15°C		
S1PH	Pressure Switch (High Side)	ACB-DB82 OFF: $2.94^{+0}_{-0.1}$MPa ON: 2.16±0.15MPa		
S1LP	Pressure Switch (Low Side)	LCB-JA21 OFF: -0.03±0.02MPa ON: 0.05±0.03MPa		
Fu	Fuse	5A 250V		

3.2.3 RU-KTAL

Capacity		RU06KTAL	RU08KTAL	RU10KTAL
M1C	Compressor	JT190B 3Ph 220V 60Hz	JT236D-P1 3ϕ 200V 5.5kW	JT300D-P1 3Ph 200V 7.5kW
K1M	Magnetic Switch	HOE-35F-TRA1 220V	HOE-35F-TRA1 220V	CLK-50JT-P12 220V
F1C	Over Current Relay	28A	35A	46A
M1F	Fan Motor (Upper)	EP-NOT 1Ph 220-240V 6P 100W	CCW681600 1Ph 220-240V 6P 230W	
M2F	Fan Motor (Lower)	EP-NOT 1Ph 220-240V 6P 100W	CCW681800 1Ph 220-240V 6P 190W	
	Fan Motor Protection Thermostat	OFF: 135±5°C ON: 120°C	OFF: 135±5°C ON: 86±15°C	
C1R	Fan Motor Capacitor	6μF, 400VAC	12μF, 400VAC	
C2R	Fan Motor Capacitor	6μF, 400VAC	12μF, 400VAC	
Q1RP	Reverse Phase Protector	RPJ-240V		
S1B	Thermistor Switch (Discharge Pipe)	UT12-3515K OFF: 135±2.5°C ON: 115±15°C		
S1PH	Pressure Switch (High Side)	ACB-DB82 OFF: $2.94^{+0}_{-0.1}$MPa ON: 2.16±0.15MPa		
S1LP	Pressure Switch (Low Side)	LCB-JA21 OFF: -0.03±0.02MPa ON: 0.05±0.03MPa		
Fu	Fuse	5A 250V		

Part 7
Troubleshooting

1. Maintenance Inspections

1.1 Overview

Guide Lines for Optimal Operation Condition

The operation value guide lines when operating under standard conditions by pushing the test run button on the remote controller are as given in the table below. R71 - 125FU are used as example outdoor units in the table.

Note: Indoor unit fan : "H" operation

		High Pressure (MPa)	Low Pressure (MPa)	Discharge Pipe Temperature (°C)	Suction Temperature (°C)	Indoor Unit Side : Differential Between Suction Temperature and Discharge Temperature (°C)	Outdoor Unit Side : Differential Between Suction Temperature and Discharge Temperature (°C)
Cooling	50 Hz	1.62~1.91 (16.5~19.5)	0.39~0.59 (4.0~6.0)	60~95	0~14	8~18	7~12
	60 Hz	1.72~2.1 (17.5~20.5)	0.34~0.54 (3.5~5.5)	70~115	-2~10		

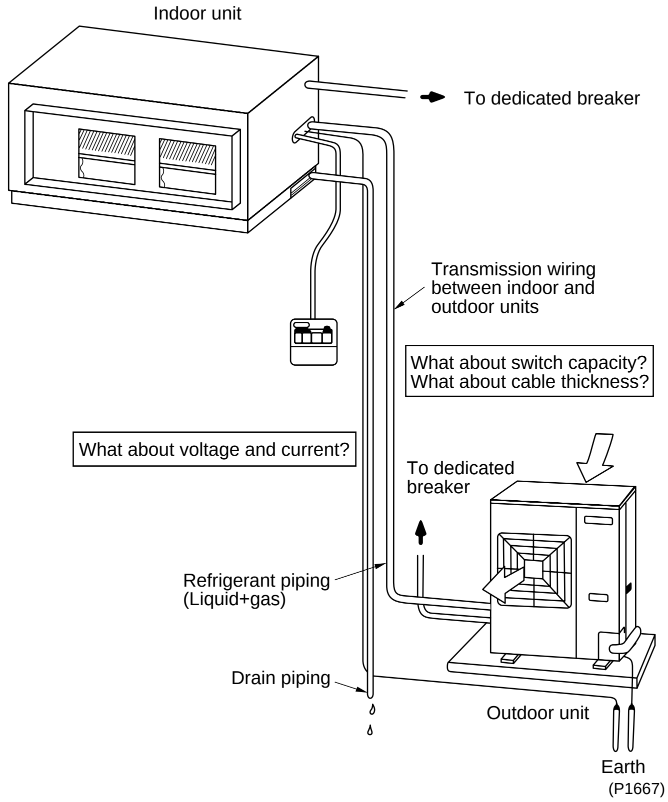
Figures given inside parentheses are in unit of kg/cm²

Note: Standard conditions

	Indoor Unit Conditions	Outdoor Unit Conditions
Cooling Operation	27°C DB/19.5°C WB	35°C DB
Heating Operation	21°C DB	7°C DB/6°C WB

- During or after maintenance, when the power supply is turned back on. operation restarts automatically by the "auto restart function. " Please exercise the proper caution.

When performing maintenance, you should at least perform the following inspections.



Correlation of Air-Conditioner's Operation Status and Pressure / Running Current

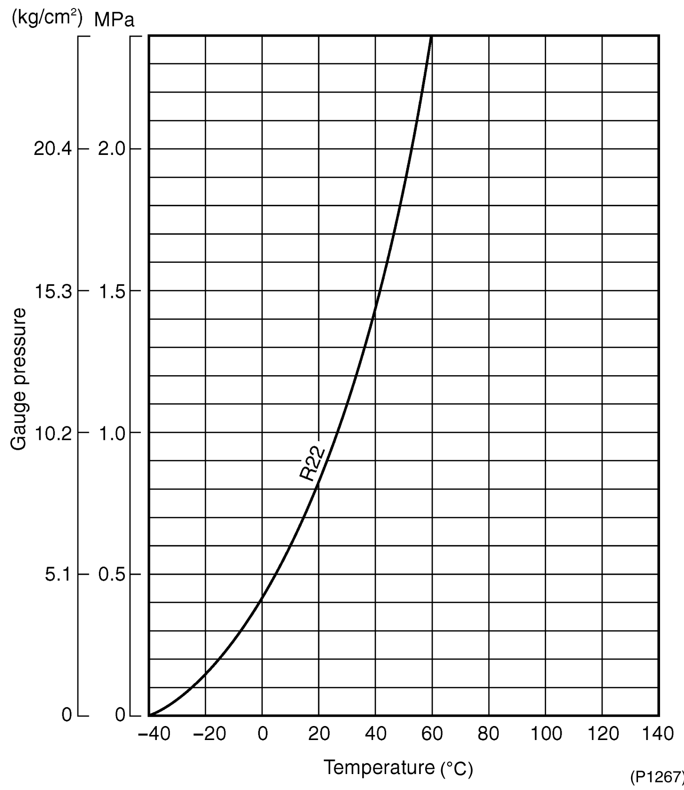
What happens in comparison to normal values is summarized in the table below. (Measured from 15 - 20 minutes or more after operation starts.)

(When cooling)

Air-Conditioner Status	Low Pressure	High Pressure	Running Current
Air Filter Fouling	Lower	Lower	Lower
Short Circuit of Indoor Unit Inlet/ Outlet Air Inlet/Outlet Air	Lower	Lower	Lower
Outdoor Unit Fin Fouling	Higher	Higher	Higher
Short Circuit of Outdoor Unit Inlet/ Outlet Air	Higher	Higher	Higher
Air Mixed in Refrigerant	Higher	Higher	Higher
Water Mixed in Refrigerant	*1 Lower	Lower	Lower
Dirt Mixed in Refrigerant	*2 Lower	Lower	Lower
Lack of Refrigerant (Gas)	Lower	Lower	Lower
Unsatisfactory Compression	*1 Higher	Lower	Lower

1. *1 Water in the refrigerant freezes inside the capillary tube, and is basically the same phenomenon as pump down.
2. *2 Dirt in the refrigerant clogs filters inside the piping, and is basically the same phenomenon as pump down.
3. Pressure differential between high and low pressure becomes slight.

Refrigerant Saturation Curve

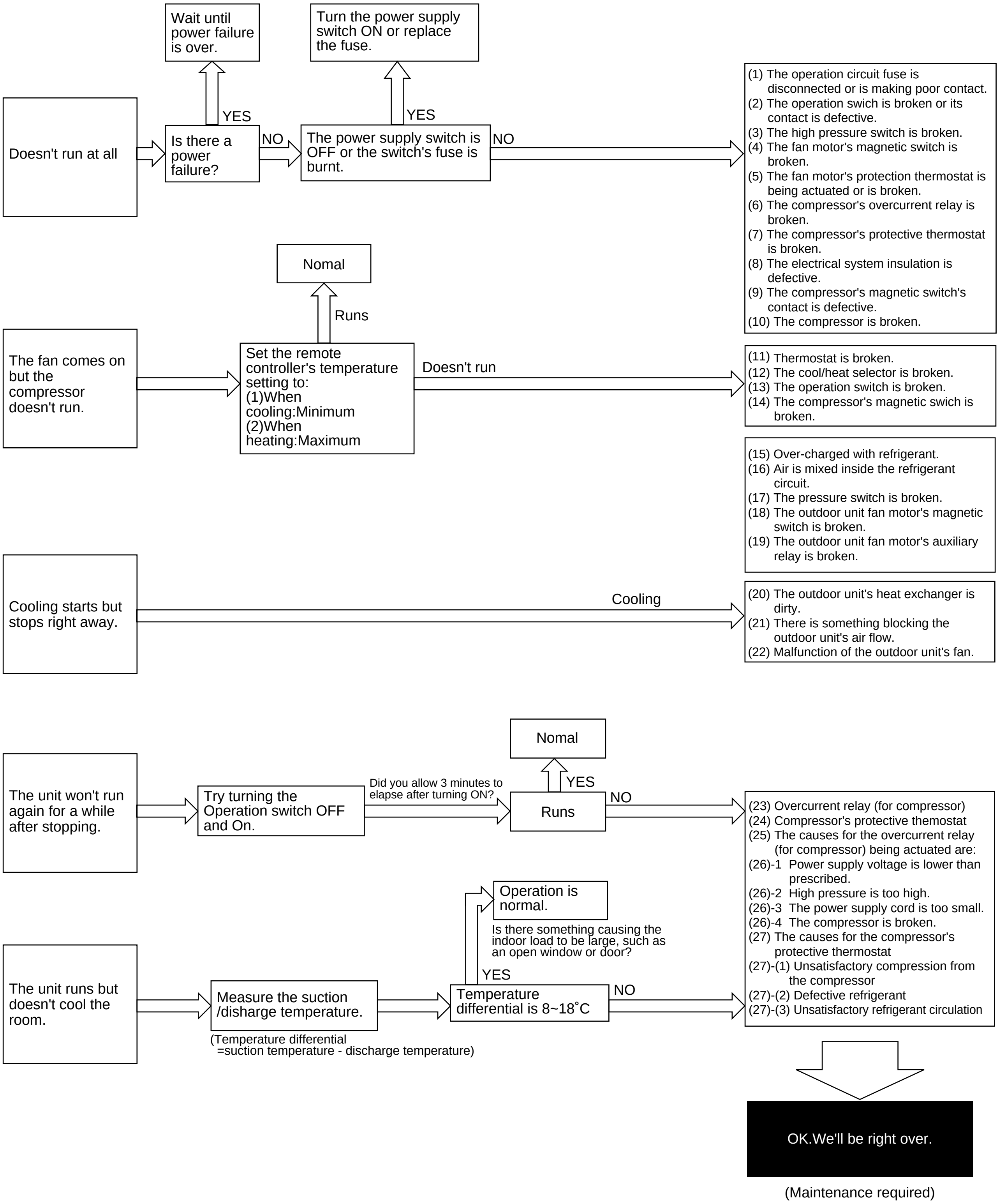


(P1267)

2. How to Handle Request for Maintenance

2.1 Flow Chart

Find out the situation according to the following procedure when there is a request for service from the customer.



(P1268)

3. Troubleshooting Based on Equipment Condition

3.1 Troubleshooting Based on Equipment Condition

	Equipment Condition	Remedy
1	Equipment does not operate.	See page 72
2	Fan operates, but compressor does not.	See page 73
3	Cooling operation starts but stops immediately.	See page 74
4	After equipment shuts down, it cannot be restarted for a while.	See page 75
5	Equipment operates but does not provide cooling.	See page 76
6	Equipment discharges white mist.	See page 77
7	Equipment produces loud noise or shakes.	See page 78
8	Equipment discharges dust.	See page 79
9	Equipment emits odor.	Room smell and cigarette odors accumulated inside the indoor unit are discharged with air. Inside of the indoor unit must be cleaned.

3.2 Equipment does not Operate

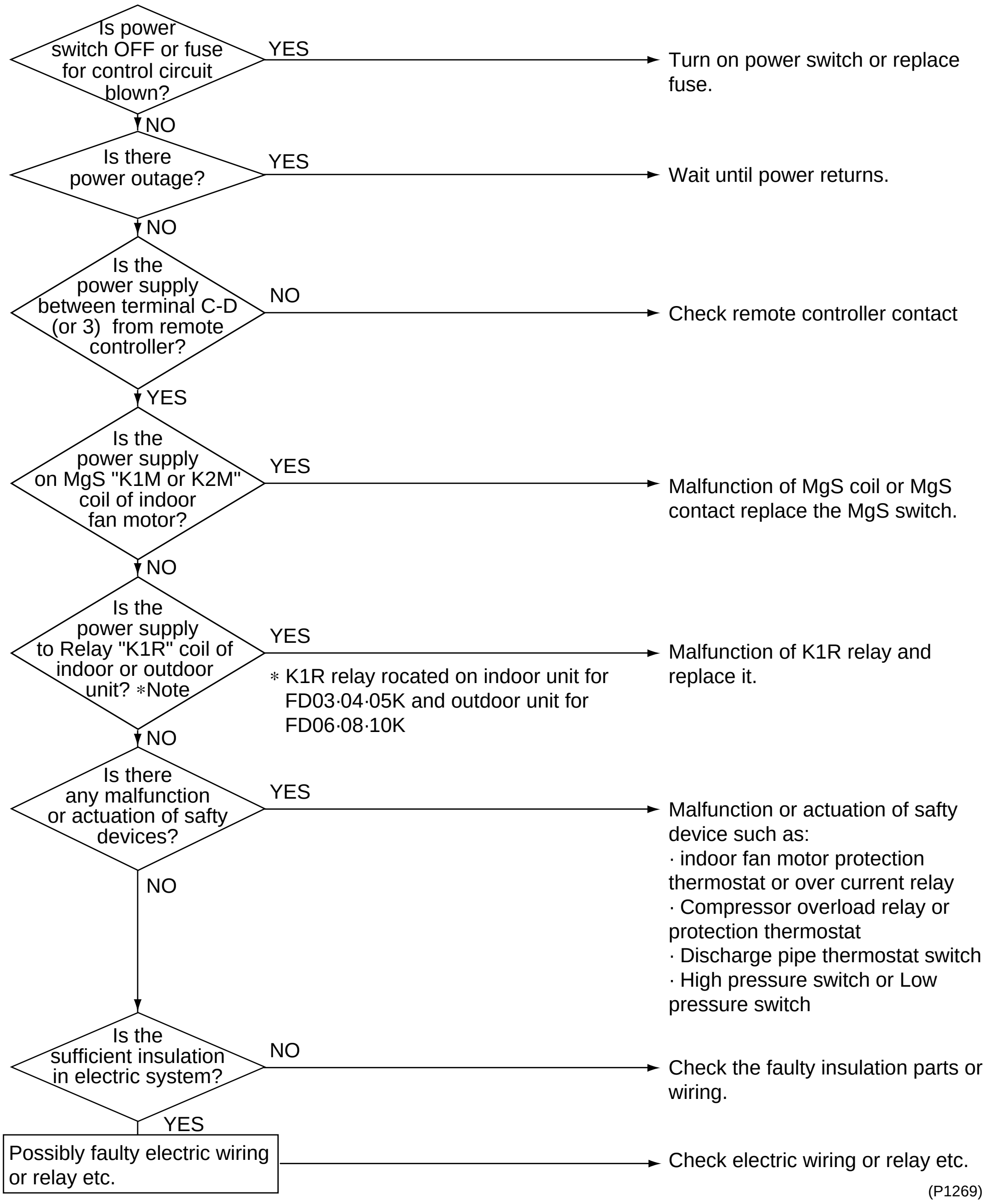
Applicable Model FD-K Series

Possible Causes

- Fuse blown or faulty contact in operation circuit
- Faulty operation switch or contact point on remote controller
- Faulty high pressure switch
- Faulty magnetic switch for fan motor
- Activation or fault of overcurrent relay or protection thermostat for fan motor
- Faulty overcurrent relay for compressor
- Faulty compressor protection thermostat
- Insufficient insulation in electric system
- Faulty contact point of magnetic switch for compressor
- Malfunction of compressor

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



3.3 Fan Operates, but Compressor does not.

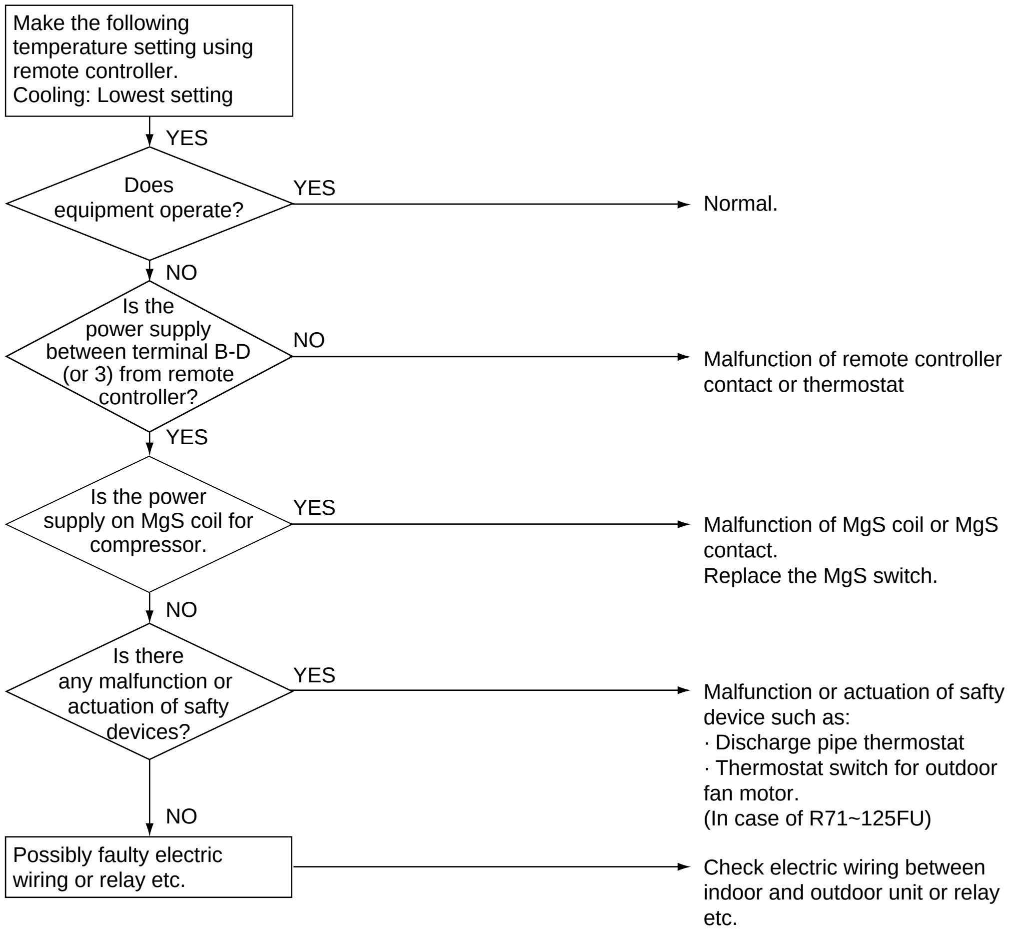
Applicable Model FD-K Series

Possible Causes

- Faulty remote controller
- Faulty magnetic switch for compressor

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1270)

3.4 Cooling Operation Starts but Stops Immediately.

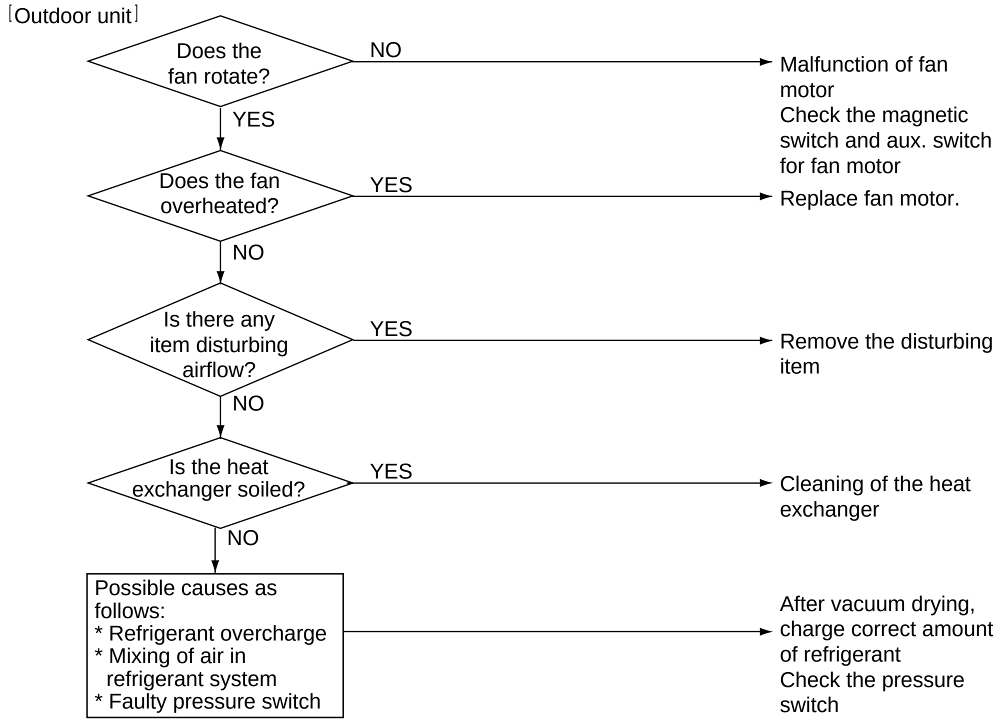
Applicable Model FD-K Series

Possible Cause

- Excess charge of refrigerant
- Air intrudes into refrigerant system
- Faulty pressure switch
- Faulty magnetic switch for outdoor unit fan motor
- Faulty aux. relay for outdoor unit fan motor
- Soiled heat exchanger of outdoor unit
- There is an interfering item in air flow of outdoor unit
- Malfunction of outdoor unit fan

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(S1271)

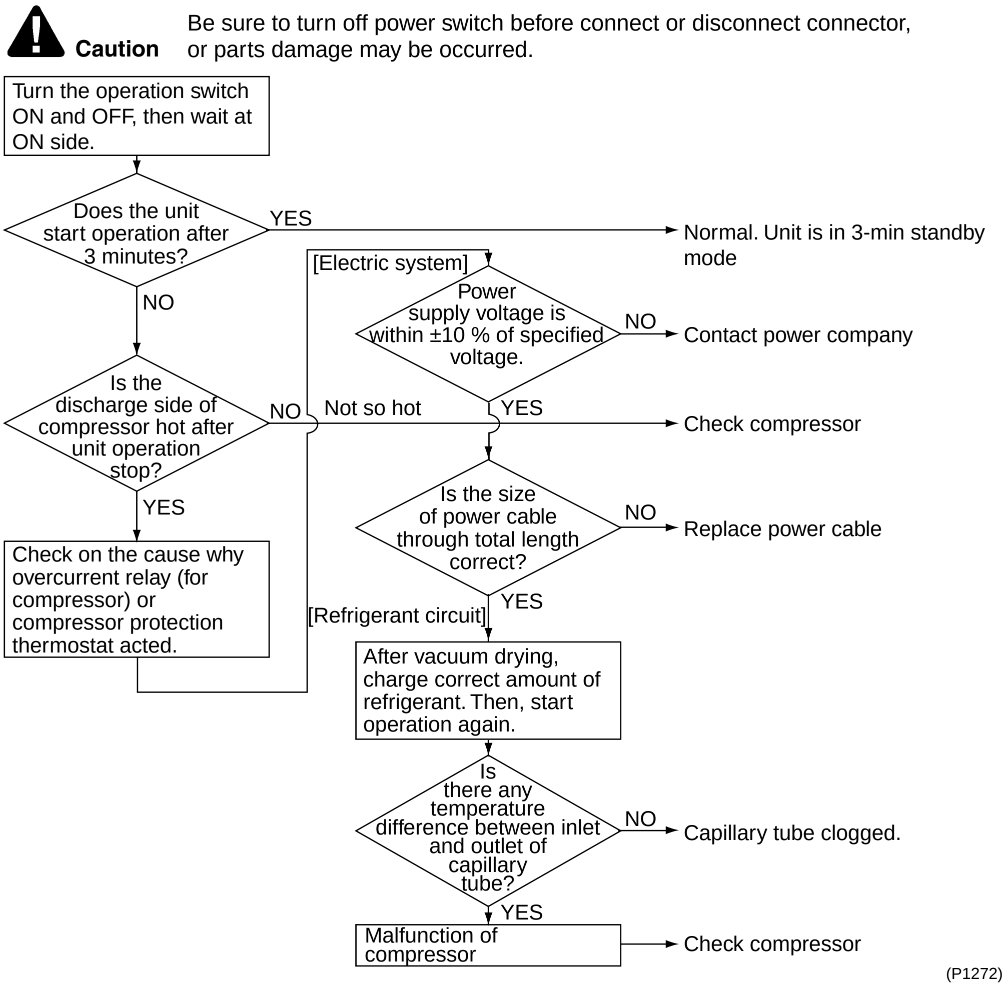
3.5 After Equipment Shuts Down, It cannot be Restarted for a While.

Applicable Model FD-K Series

Possible Cause

- Overcurrent relay (for compressor)
- Compressor protection thermostat
- Overcurrent relay may act due to the following reasons
  Lower voltage of power supply
  Excess level of high pressure
  Insufficient capacity of power cable
  Malfunction of compressor
- Compressor protection thermostat may act due to the following reasons
  Insufficient compression of compressor
  Incorrect refrigerant
  Insufficient circulation of refrigerant

Troubleshooting



3.6 Equipment Operates but does not Provide Cooling.

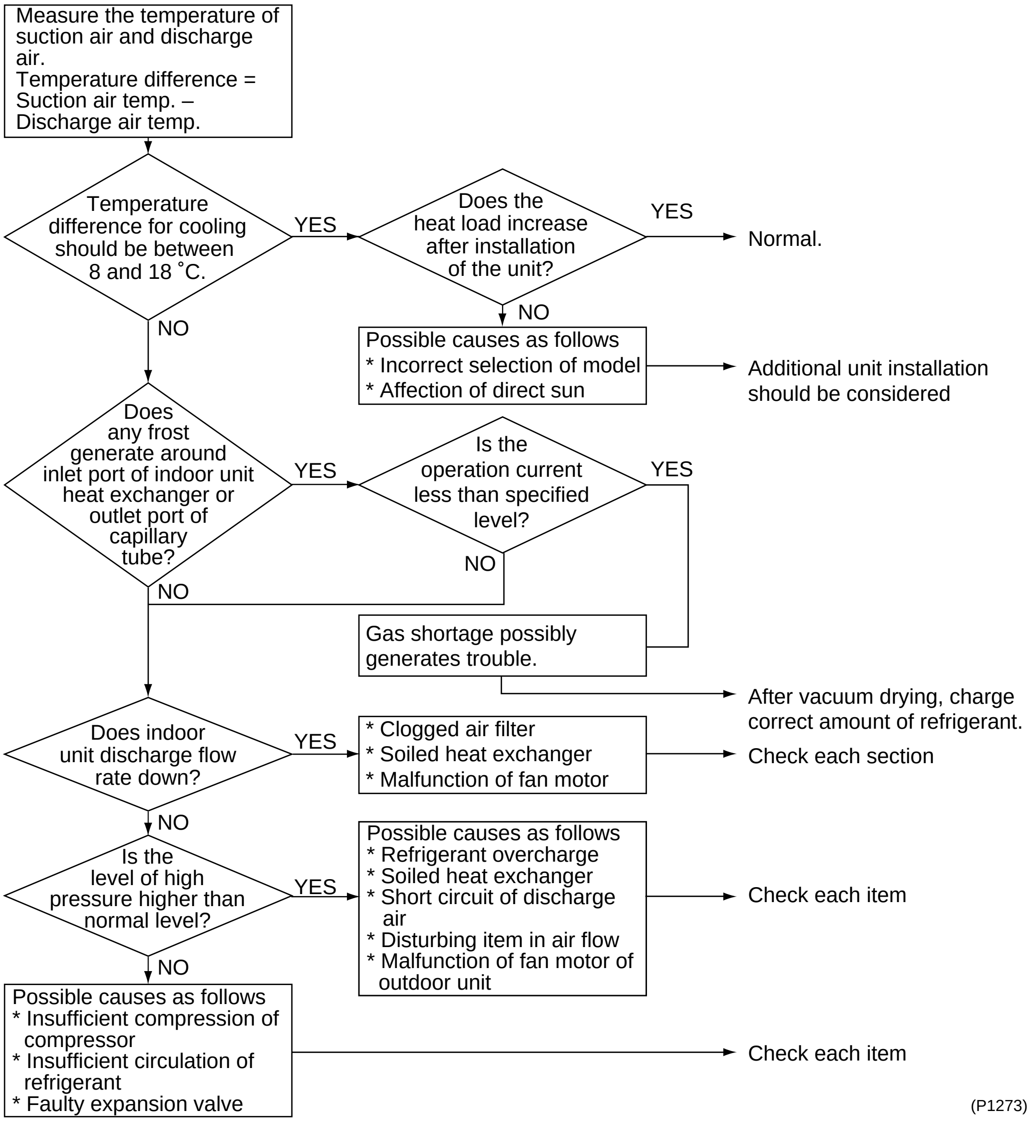
Applicable Model FD-K Series

Possible Cause

- Overcurrent relay (for compressor)
- Compressor protection thermostat
- Overcurrent relay may act due to the following reasons
  Lower voltage of power supply
  Excess level of high pressure
  Insufficient capacity of power cable
  Malfunction of compressor
- Compressor protection thermostat may act due to the following reasons
  Insufficient compression of compressor
  Incorrect refrigerant
  Insufficient circulation of refrigerant

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1273)

3.7 Equipment Discharges White Mist

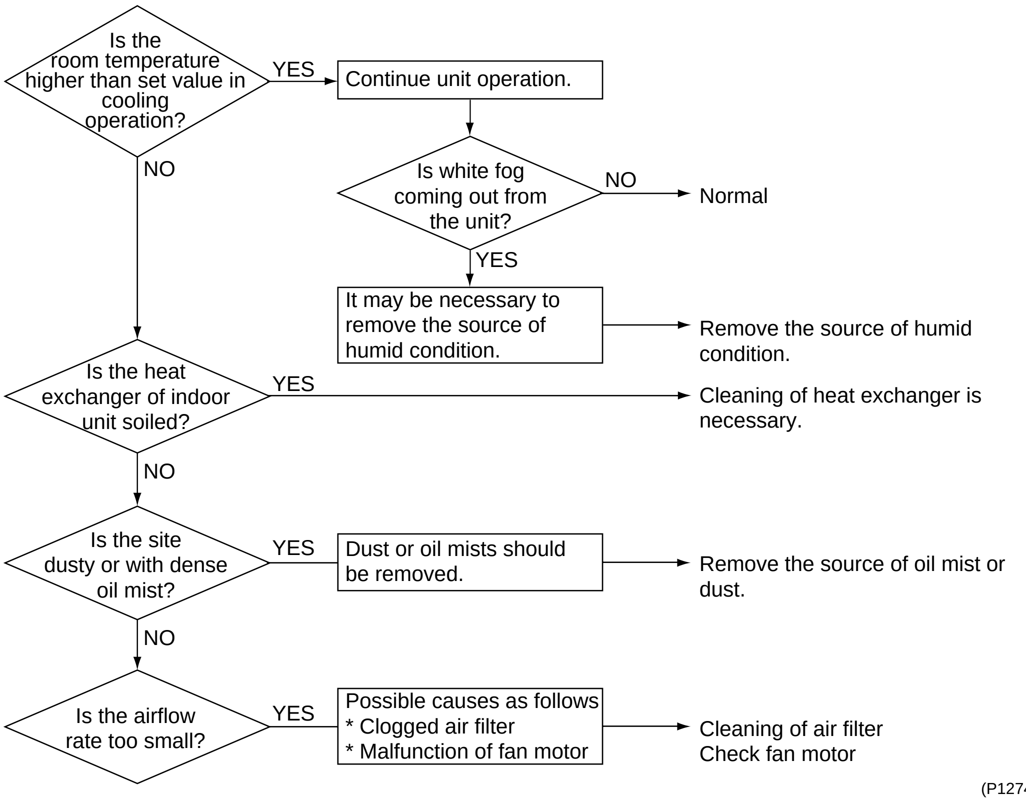
Applicable Model FD-K Series

Possible Cause

- Humid installation site
- Installation site is dirty and with dense oil mists.
- Soiled heat exchanger
- Clogged air filter
- Malfunction of fan motor

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1274)

3.8 Equipment Produces Loud Noise or Shakes

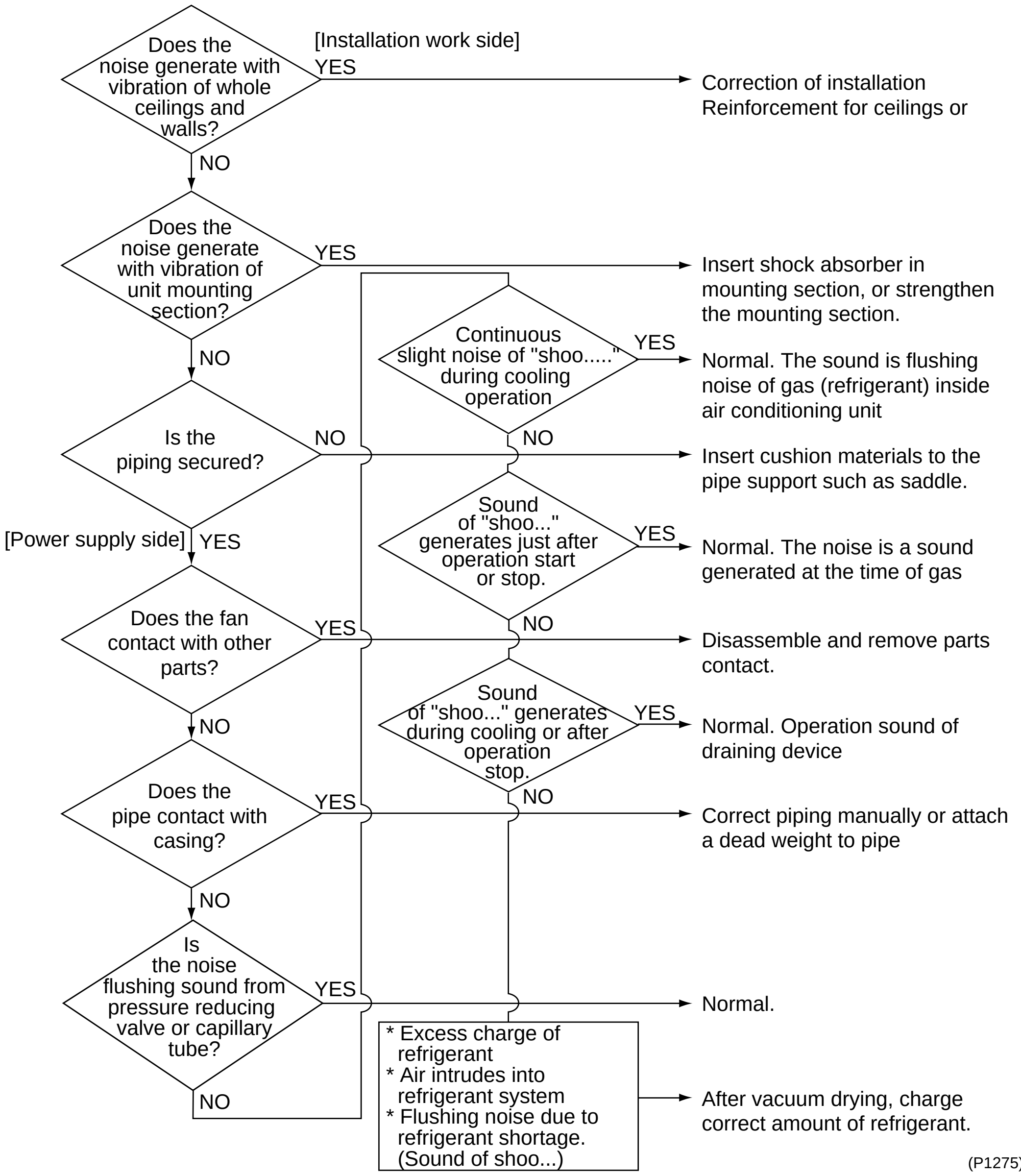
Applicable Model FD-K Series

Possible Cause

- Excess charge of refrigerant
- Air intrudes into refrigerant system
- Flushing noise due to refrigerant shortage. (Sound of shooee)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1275)

3.9 Equipment Discharges Dust.

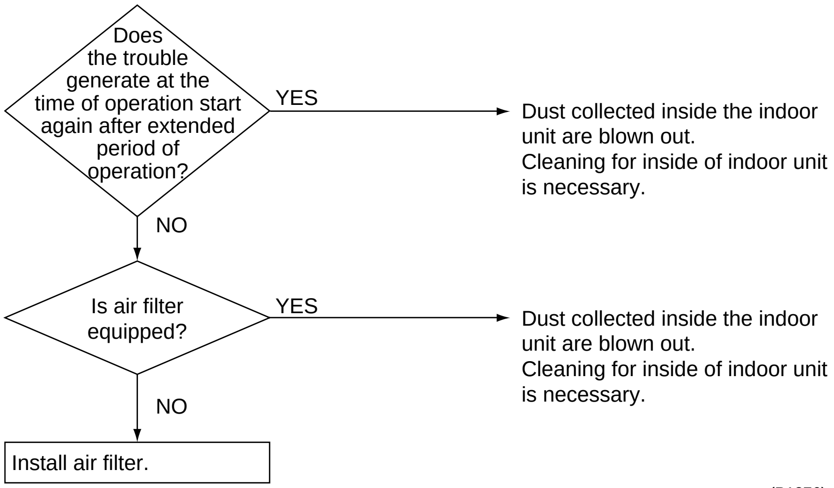
Applicable Model FD-K Series

Possible Cause

- Carpet spread room
- Animal's hair

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



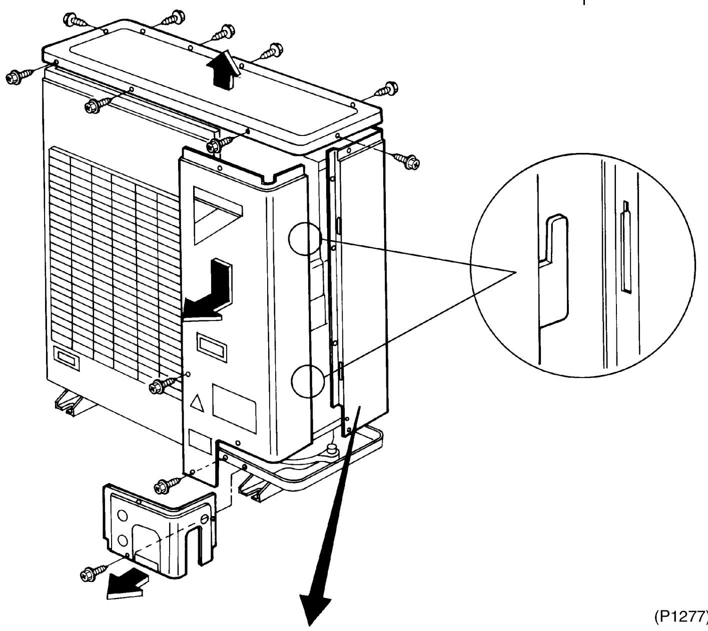
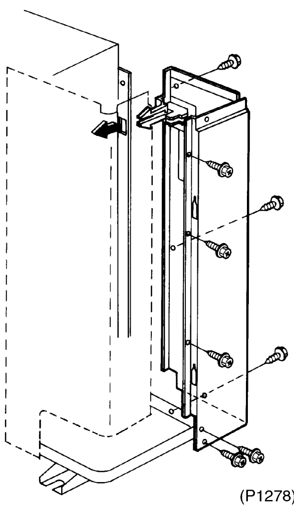
(P1276)

Part 8
Removal Procedure

1. For R71FUY1

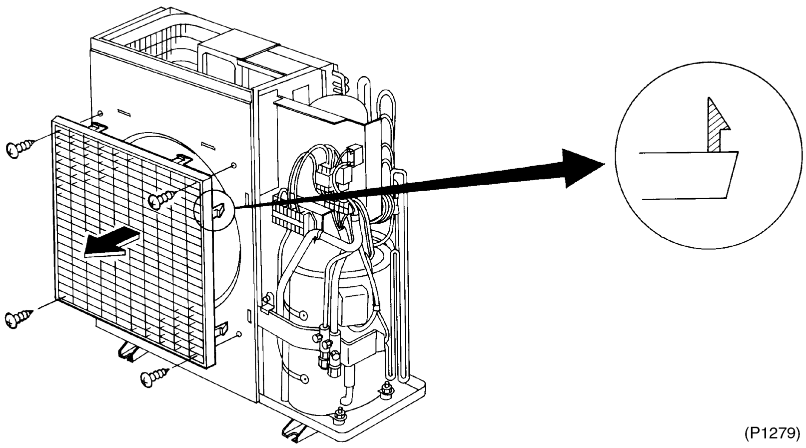
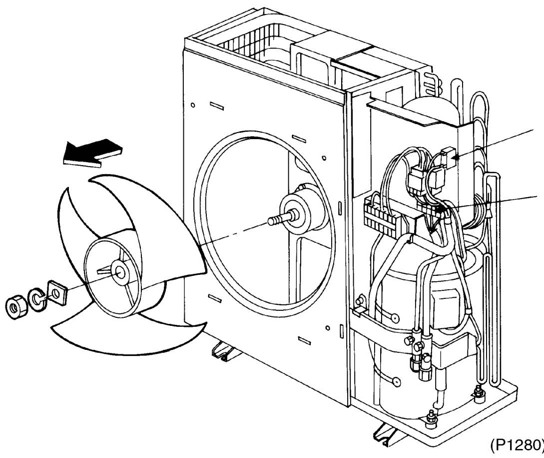
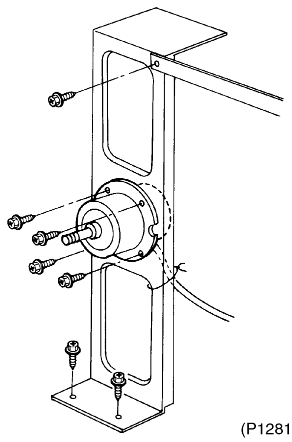
1.1 Removal of External Casing

Procedure ⚠ **Warning** **Be sure to turn off all power supplies before disassembling work.**

Step	Procedure		Points
1	Remove the 9 top plate screws.	 (P1277)	
2	Remove the screw of the front piping cover.		
3	Remove the 3 screws of the front casing and remove by pushing downward.		
4	Remove the 8 screws of the side casing.	 (P1278)	

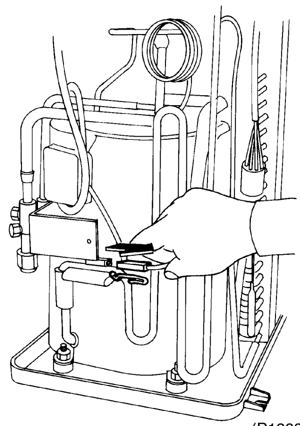
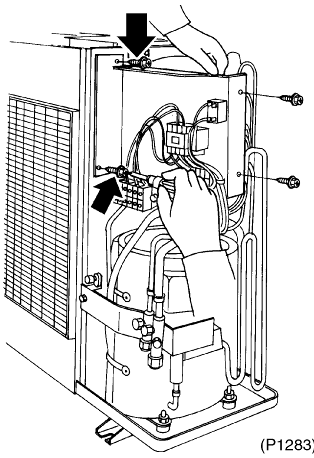
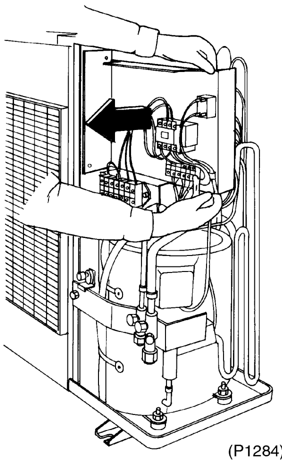
1.2 Removal of Outdoor Unit Fan and Fan Motor

Procedure ⚠ **Warning** **Be sure to turn off all power supplies before disassembling work.**

Step		Procedure	Points
■	Remove the front piping cover, etc., according to the procedure for removing the external casing.		
1	Remove the 4 screws and disconnect the 8 tabs fastening the air discharge grille on the top/bottom and left/ right, and remove the air discharge grille.		(P1279)
2	Remove the screw cover by inserting a slotted screwdriver and twisting it.	 (P1280)	
3	Disconnect the motor connector from the PC board's wiring connector and remove the capacitor.		
4	Remove the 4 hexagon bolts fastening the fan motor, and remove the fan motor.	 (P1281)	
5	The motor base can be dismounted by removing the 3 hexagon bolts.		

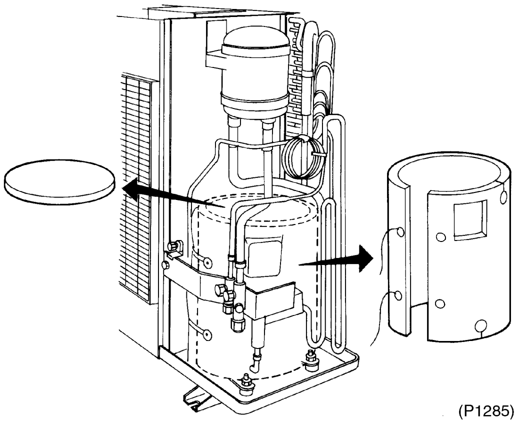
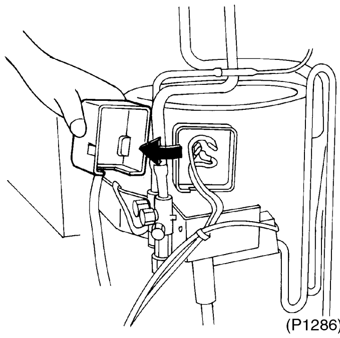
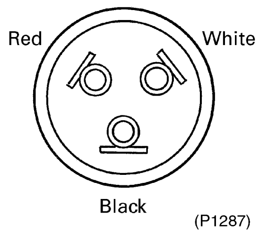
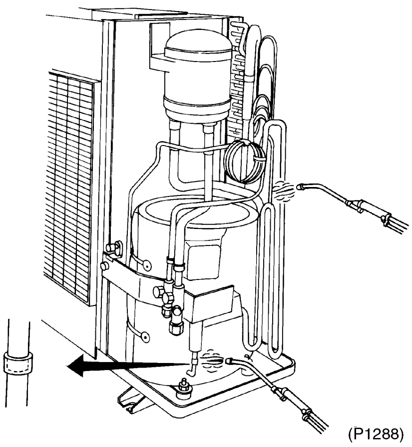
1.3 Removal of Electrical Parts Box

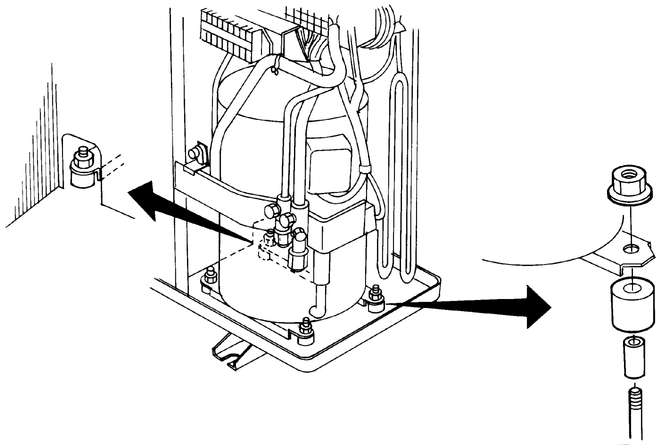
Procedure **Warning** **Be sure to turn off all power supplies before disassembling work.**

Step	Procedure		Points
■	Remove the top plate, front casing and side casing according the procedure for removing.	 (P1282)	
1	Remove the temperature switch for discharge. (If not removing, disconnect the relay connector.)		**Caution** If the lead wire is clamped by the piping, etc., remove the clamp.
2	Remove the electrical parts box installation 2 screws with holding the electrical parts box.	 (P1283)	**Note:** If not dismounting the side casing, remove the 4 screws of the electrical parts box.
3	Remove the electrical parts box.	 (P1284)	

1.4 Removal of Compressor

Procedure ⚠ **Warning** **Be sure to turn off all power supplies before disassembling work.**

Step		Procedure	Points
■ Remove the external casing, etc., according to its removal procedure.		 (P1285)	
1	Remove the compressor soundproofing.		
2	Disconnect the compressor lead wire form the compressor terminal.	 (P1286)	 (P1287)
3	Heat the brazed parts of the discharge and suction pipes, and remove from the piping side withe a pair of pliers, etc.	 (P1288)	

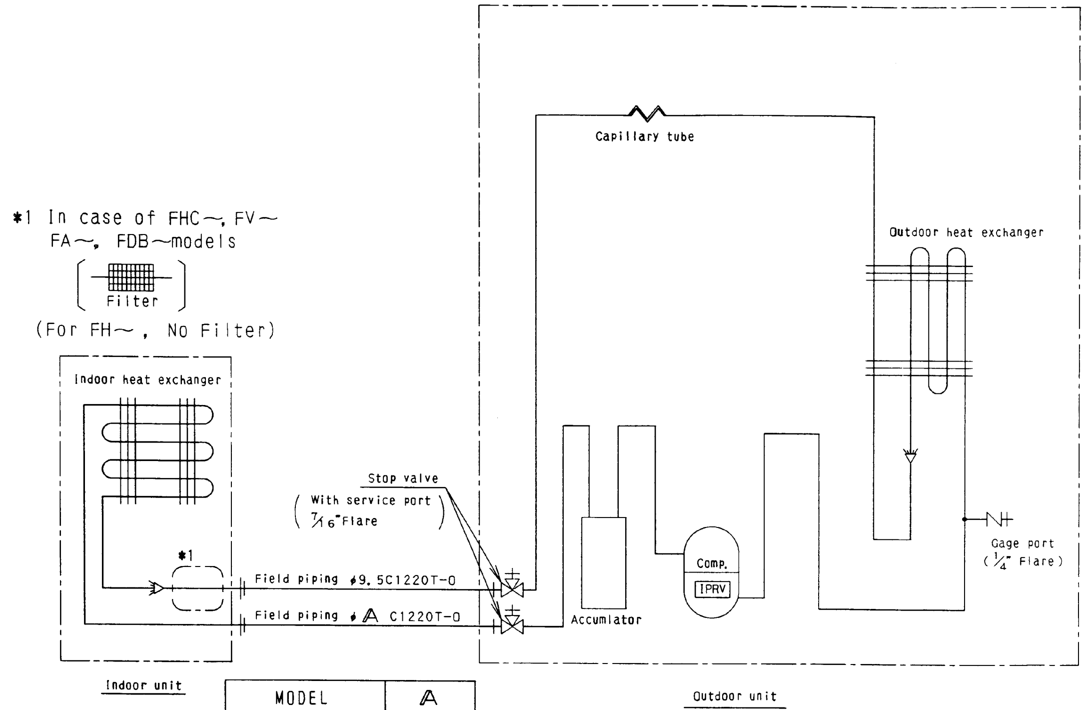
Step	Procedure		Points
4	Remove the compressor’s 4 washer based nuts. Use a T-type box spanner.	 (P1289)	
5	Lift the compressor slightly and draw out toward yourself.		

Part 9
Appendix

1. Piping Diagrams

1.1 Cooling Only

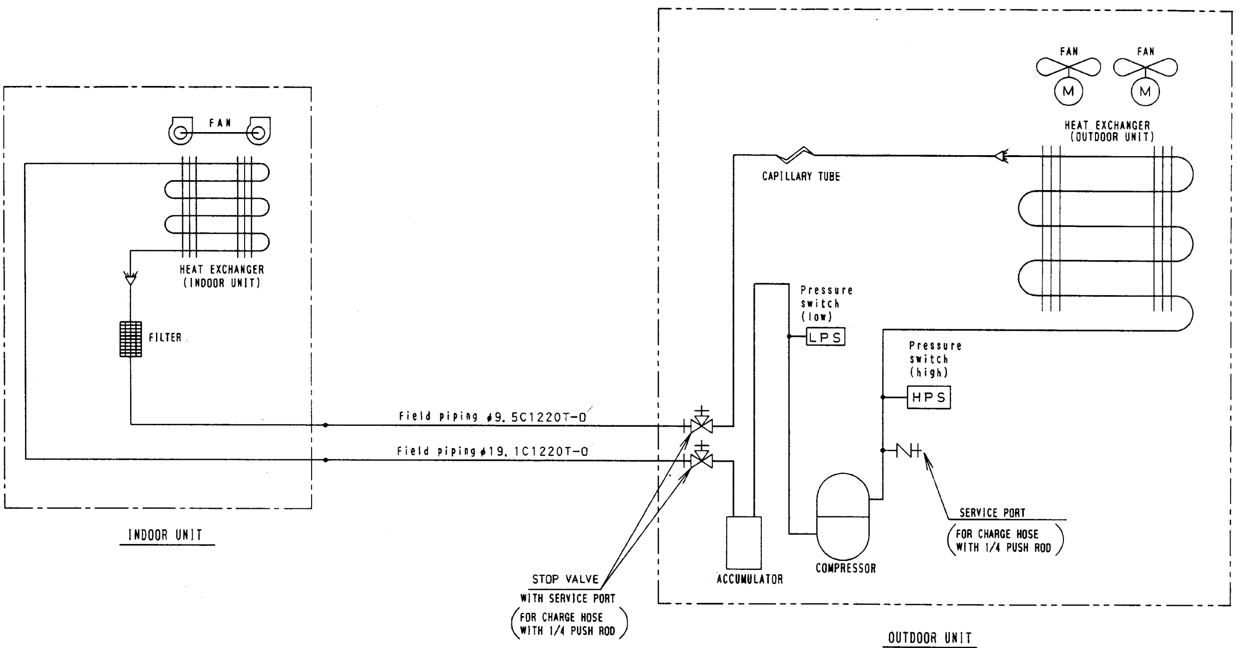
FD03K+R71FU / FD04K+R100FU / FD05K+R125FU



MODEL	A
R71FU~	15. 9
R100・125FU~	19. 1

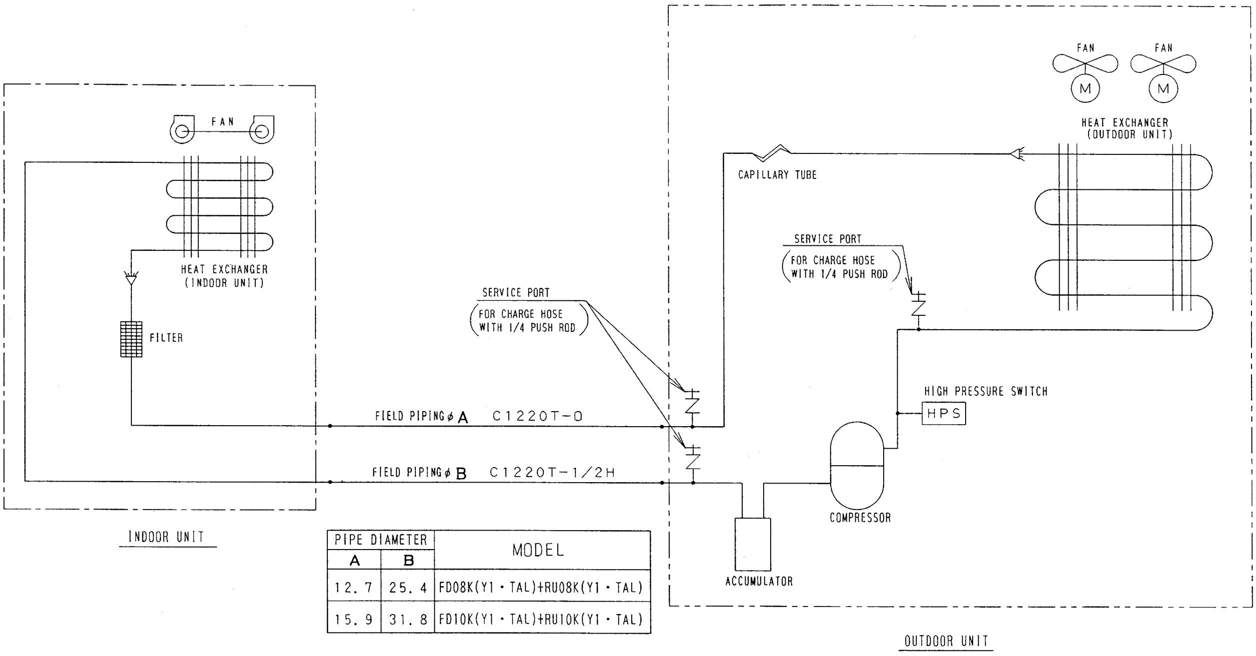
3D001310A

FD06K+RU06K



3D008103

FD08K+RU08K / FD10K+RU10K

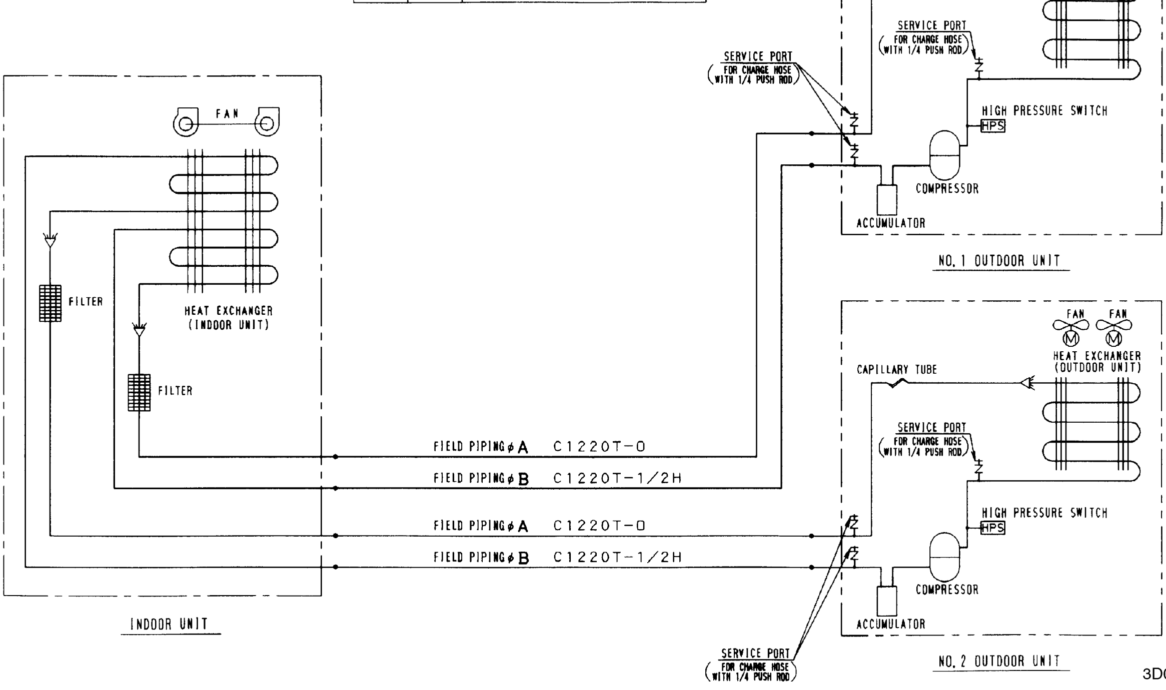


PIPE DIAMETER		MODEL
A	B	
12. 7	25. 4	FD08K(Y1・TAL)+RU08K(Y1・TAL)
15. 9	31. 8	FD10K(Y1・TAL)+RU10K(Y1・TAL)

3D004873

FD15K+RU08K×2 / FD20K+RU10K×2

PIPE DIAMETER		MODEL
A	B	
12. 7	25. 4	FD15K(Y1・TAL)+RU08K(Y1・TAL)×2
15. 9	31. 8	FD20K(Y1・TAL)+RU10K(Y1・TAL)×2

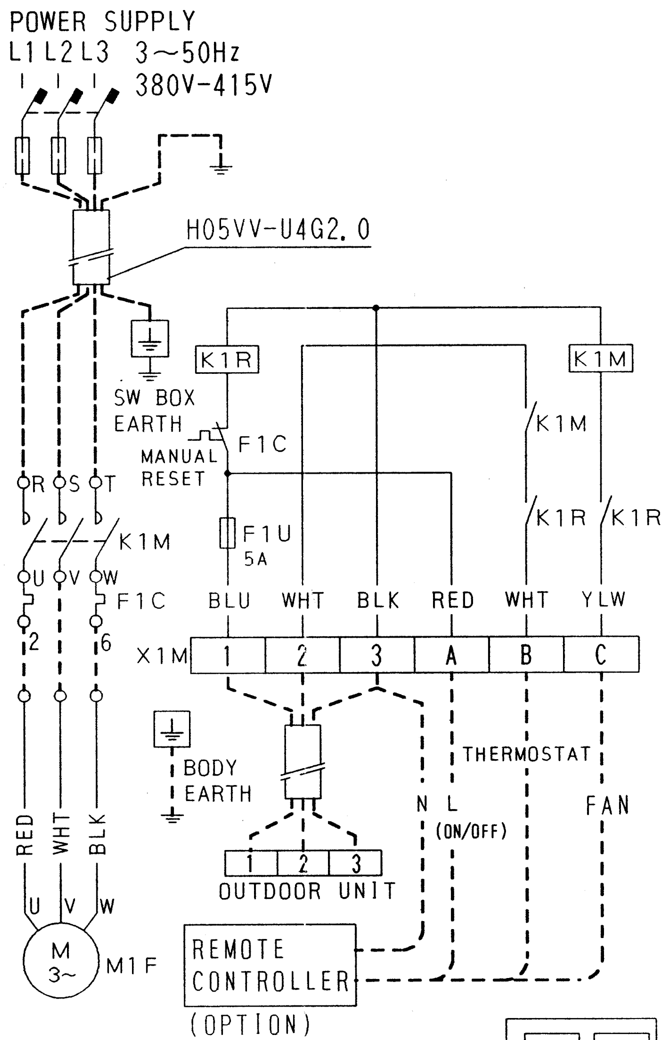


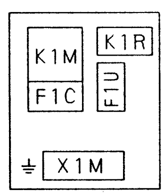
3D010032

2. Wiring Diagram

2.1 50Hz

FD03·04·05KY1





SWITCH BOX

NOTES) 1. ▭▭▭▭ : TERMINAL
-o- : WIRE CLAMP
2. - - - - - : FIELD WIRING
3. SYMBOLS SHOWN BELOW
BLK:BLACK BLU:BLUE RED:RED
WHT:WHITE YLW:YELLOW

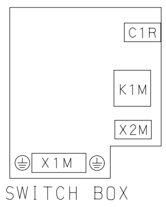
SWITCH BOX

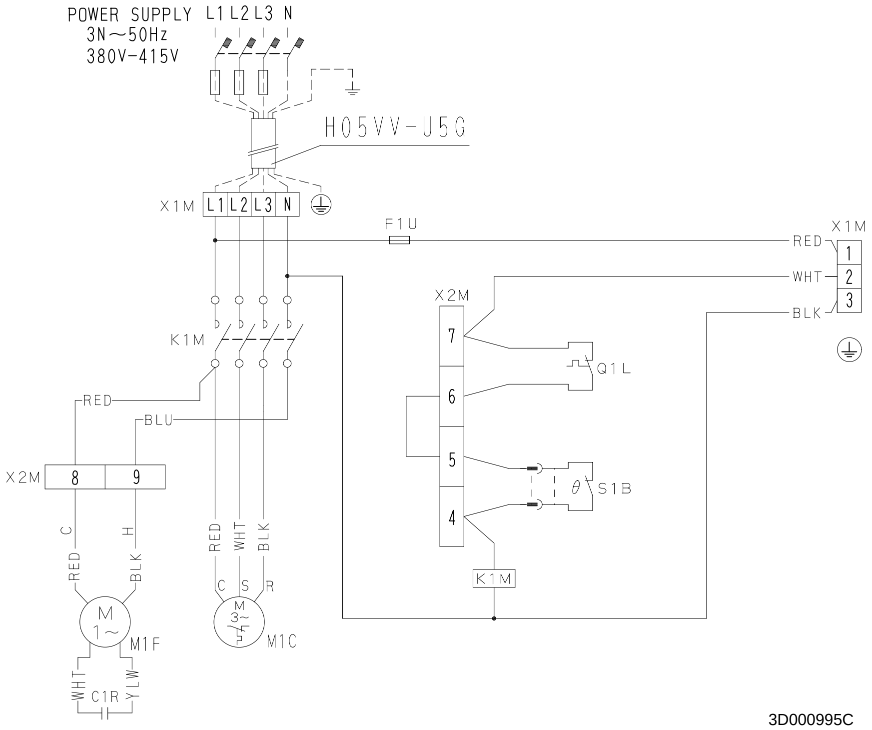
F1C	OVER CURRENT RELAY
F1U	FUSE(5A, 250V)
K1M	MAGNETIC CONTACTOR (M1F)(220V-240V)
K1R	MAGNETIC RELAY(220V-240V)
L1-RED	L2-WHT L3-BLK
M1F	MOTOR (FAN)(380V-415V)
X1M	TERMINAL STRIP

3D003690B

R71FUY1

L1–RED	L2–WHT	L3–BLK	N–BLU
C1R	CAPACITOR (M1F)		
F1U	FUSE (250V, 5A)		
K1M	MAGNETIC CONTACTOR (M1C)		
M1C	MOTOR (COMPRESSOR)		
M1F	MOTOR (FAN)		
Q1L	THERMO SWITCH (M1F)		
S1B	THERMO SWITCH (DISCHARGE PIPE)		
X1M	TERMINAL STRIP		
X2M	TERMINAL STRIP		



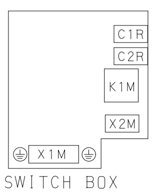


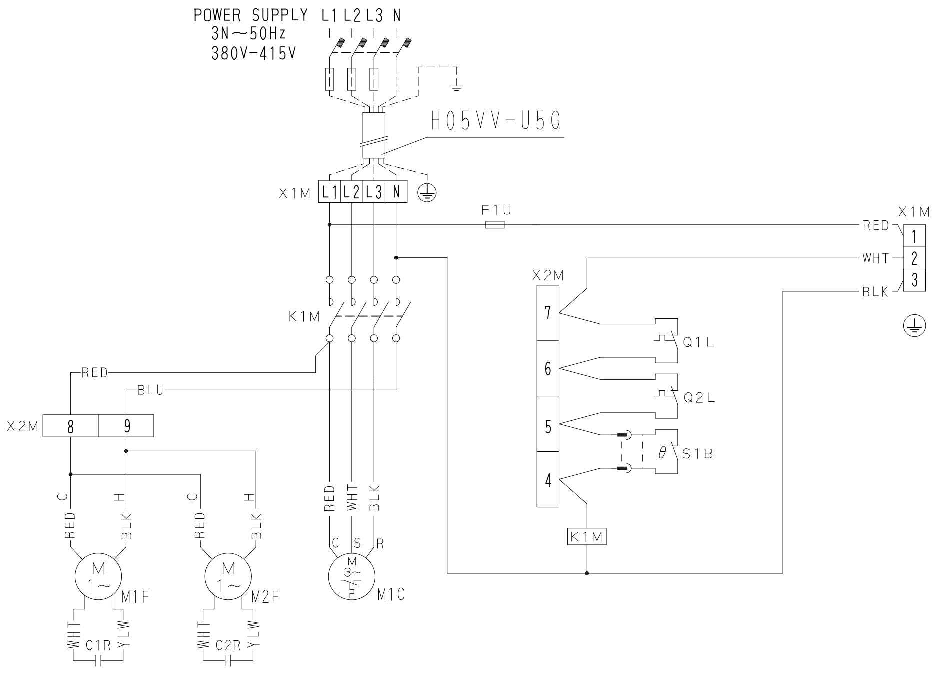
NOTES) 1. ▭▭▭ : TERMINAL
—o— : WIRE CLAMP
: CONNECTOR
2. ----- : FIELD WIRING
3. SYMBOLS SHOW AS FOLLOWS
BLK: BLACK RED: RED
BLU: BLUE WHT: WHITE YLW: YELLOW
4. POWER SUPPLY FOR THE MODEL OF R71FUY1C IS 380V ONLY.

3D000995C

R100FUY1 / R125FUY1

L1–RED	L2–WHT	L3–BLK	N–BLU
C1R·C2R	CAPACITOR (M1F·M2F)		
F1U	FUSE (250V, 5A)		
K1M	MAGNETIC CONTACTOR (M1C)		
M1C	MOTOR (COMPRESSOR)		
M1F·M2F	MOTOR (FAN)		
Q1L·Q2L	THERMO SWITCH (M1F·M2F)		
S1B	THERMO SWITCH (DISCHARGE PIPE)		
X1M	TERMINAL STRIP		
X2M	TERMINAL STRIP		

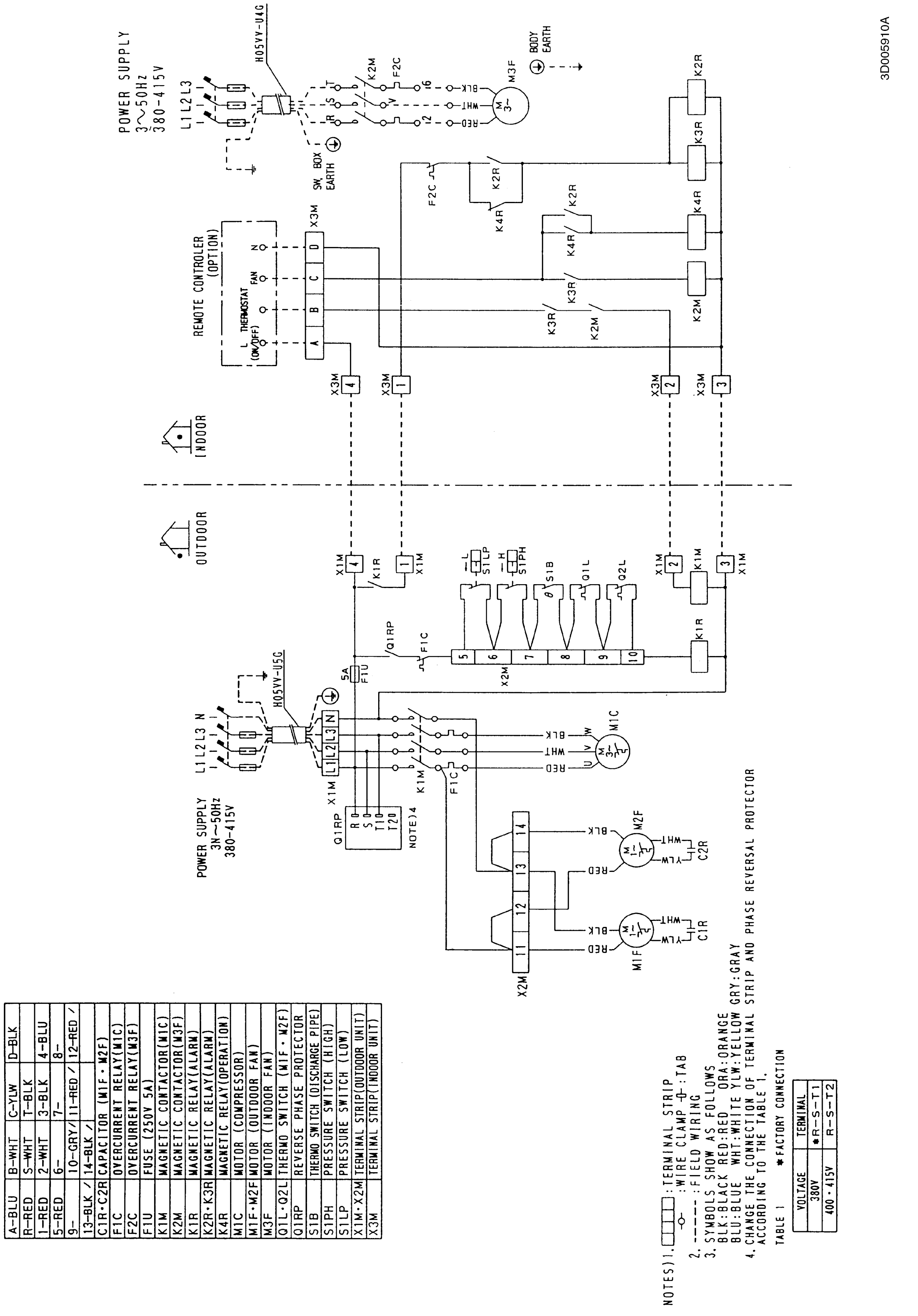




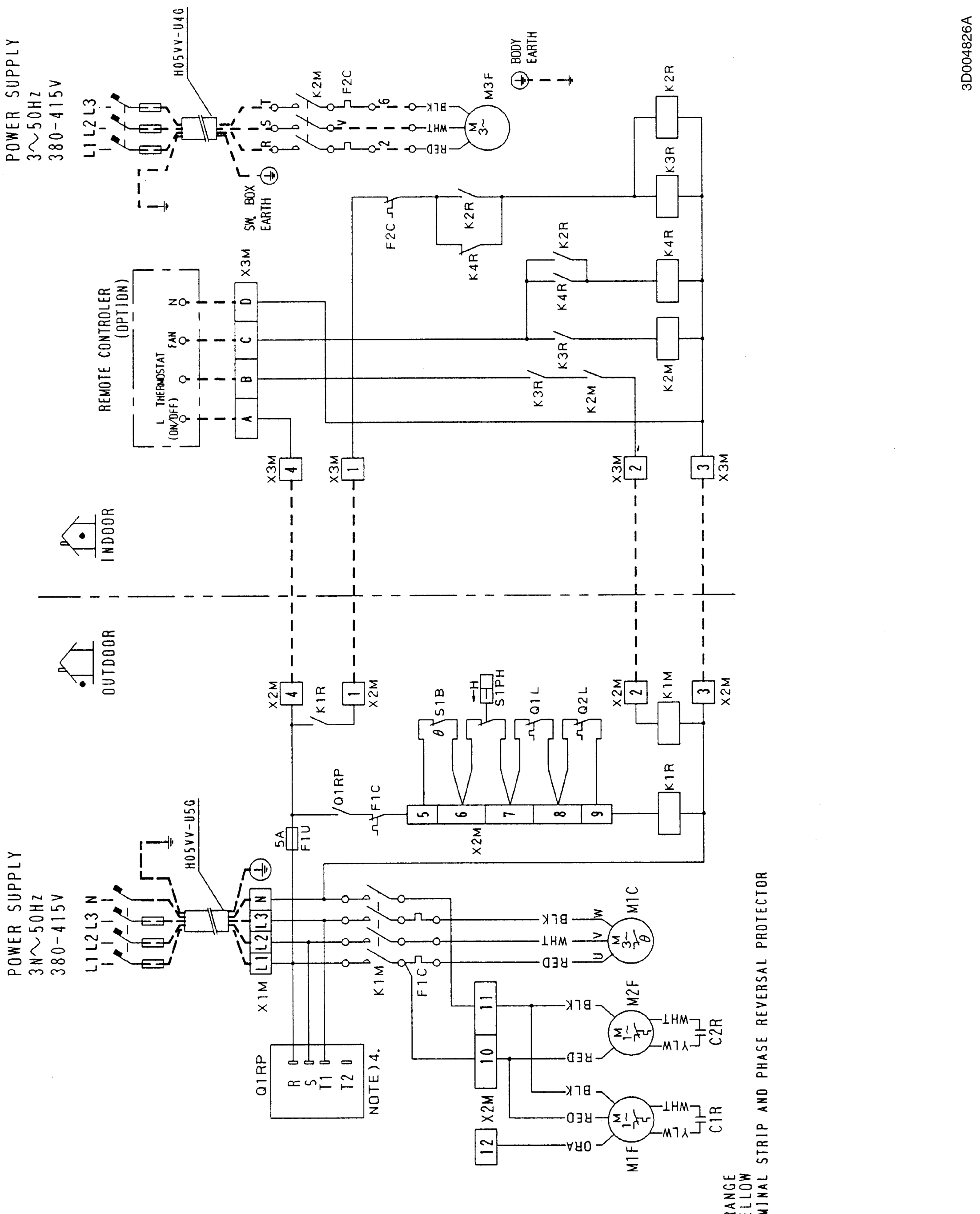
NOTES) 1. ▭▭▭ : TERMINAL
—o— : WIRE CLAMP
: CONNECTOR
2. ----- : FIELD WIRING
3. SYMBOLS SHOW AS FOLLOWS
BLK: BLACK RED: RED
BLU: BLUE WHT: WHITE YLW: YELLOW
4. POWER SUPPLY FOR THE MODELS OF R100·125FUY1 AND R125FUY1S IS 380V ONLY.

3D001007C

FD06KY1+RU06KY1



FD08KY1+RU08KY1 / FD10KY1+RU10KY1



A-BLUE	B-WHITE	C-YELLOW	D-BLACK
L1-RED	L2-WHITE	L3-BLACK	N-BLUE
1-RED	2-WHITE	3-BLACK	4-BLUE
5-WHITE	6-	7-	8-
9-GRAY	10-RED	11-BLACK	12-

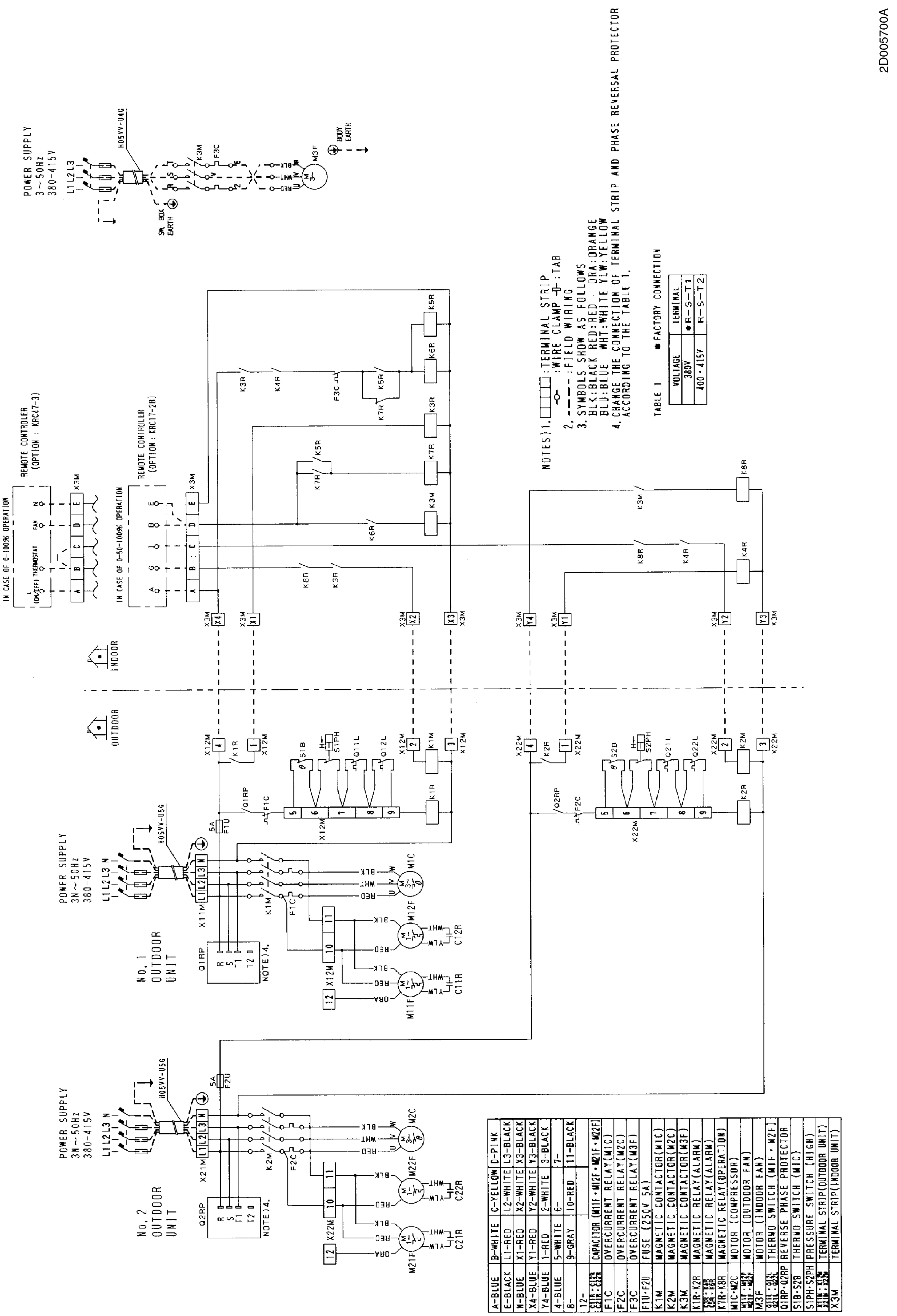
C1R·C2R	CAPACITOR (M1F · M2F)
F1C	OVERCURRENT RELAY(M1C)
F2C	OVERCURRENT RELAY(M3F)
F1U	FUSE (250V 5A)
K1M	MAGNETIC CONTACTOR(M1C)
K2M	MAGNETIC CONTACTOR(M3F)
K1R	MAGNETIC RELAY(ALARM)
K2R·K3R	MAGNETIC RELAY(ALARM)
K4R	MAGNETIC RELAY(OPERATION)
M1C	MOTOR (COMPRESSOR)
M1F·M2F	MOTOR (OUTDOOR FAN)
M3F	MOTOR (INDOOR FAN)
Q1L·Q2L	THERMO SWITCH (M1F · M2F)
Q1RP	REVERSE PHASE PROTECTOR
S1B	THERMO SWITCH (M1C)
S1PH	PRESSURE SWITCH (HIGH)
X1M·X2M	TERMINAL STRIP(OUTDOOR UNIT)
X3M	TERMINAL STRIP(INDOOR UNIT)

NOTES) 1. ▭▭▭ : TERMINAL STRIP
-o- : WIRE CLAMP -[]- : TAB
2. - - - - : FIELD WIRING
3. SYMBOLS SHOW AS FOLLOWS
BLK:BLACK RED:RED ORA:ORANGE
BLU:BLUE WHT:WHITE YLW:YELLOW
4. CHANGE THE CONNECTION OF TERMINAL STRIP AND PHASE REVERSAL PROTECTOR ACCORDING TO THE TABLE 1.

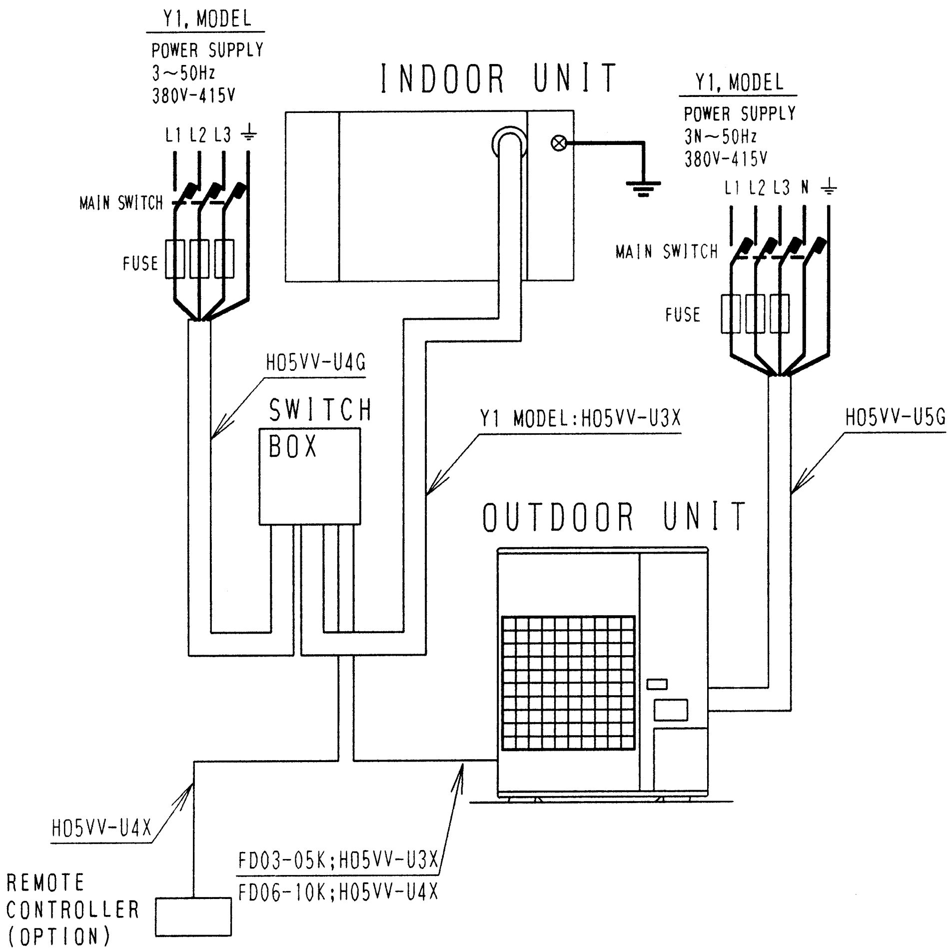
TABLE 1 *FACTORY CONNECTION

VOLTAGE	TERMINAL
380V	*R-S-T1
400 · 415V	R-S-T2

FD15KY1+RU08KY1×2 / FD20KY1+RU10KY1×2



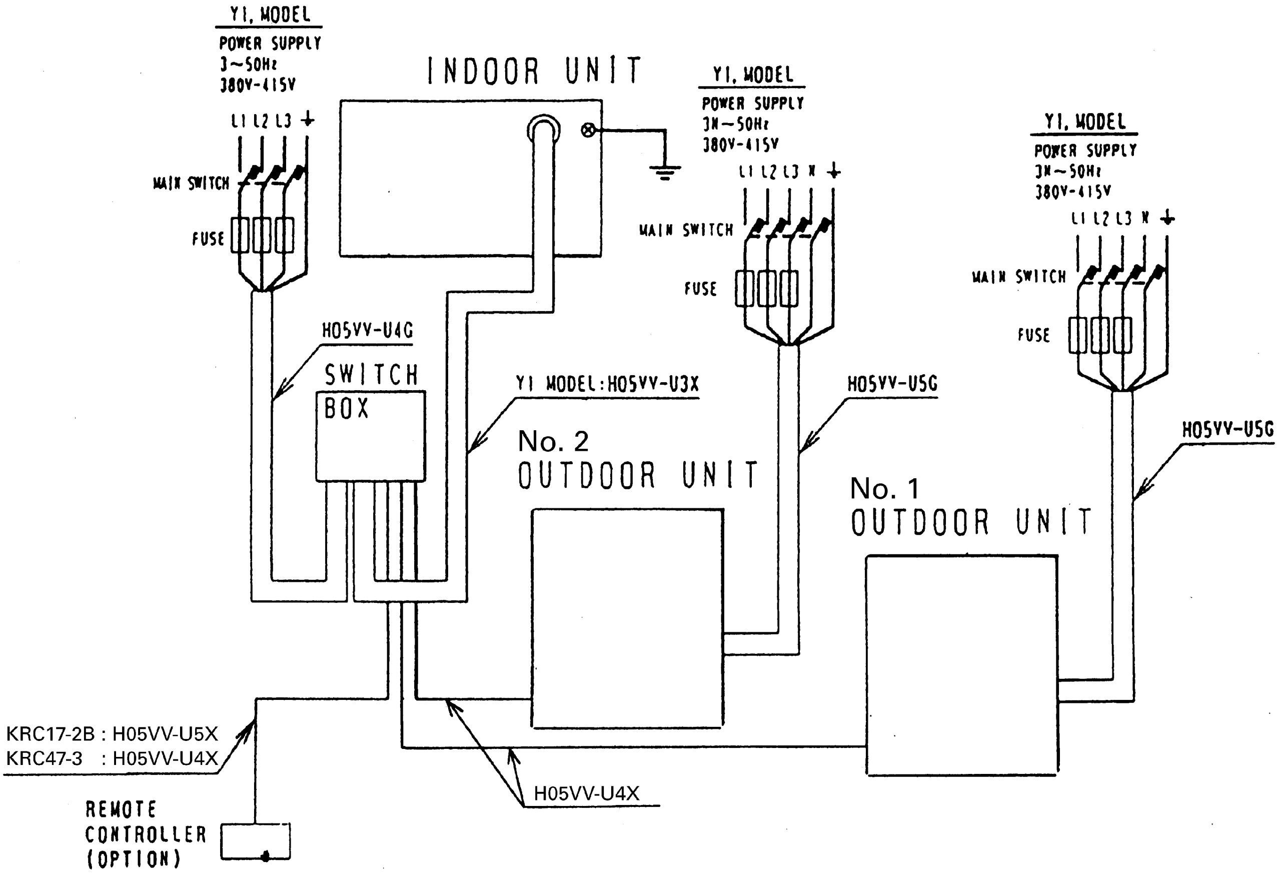
FD03~10KY1



Notes
1) ——— Line voltage wiring
——— Control circuit wiring
2) All wiring, components and materials to be procured on the site must comply with the applicable local and national codes.
3) Use copper conductor only.
4) As for details, see wiring diagrams.
5) Install fuse and mainswitch for safety.
6) All field wiring and components must be provided by a licensed electrician.
7) Unit shall be grounded in compliance with the applicable local and national codes.
8) Wiring shown are general points-of-connection guides only and are not intended for or to include all details for a specific installation.
9) Never share a common power source with other equipment.

4D004694A

FD15·20KY1

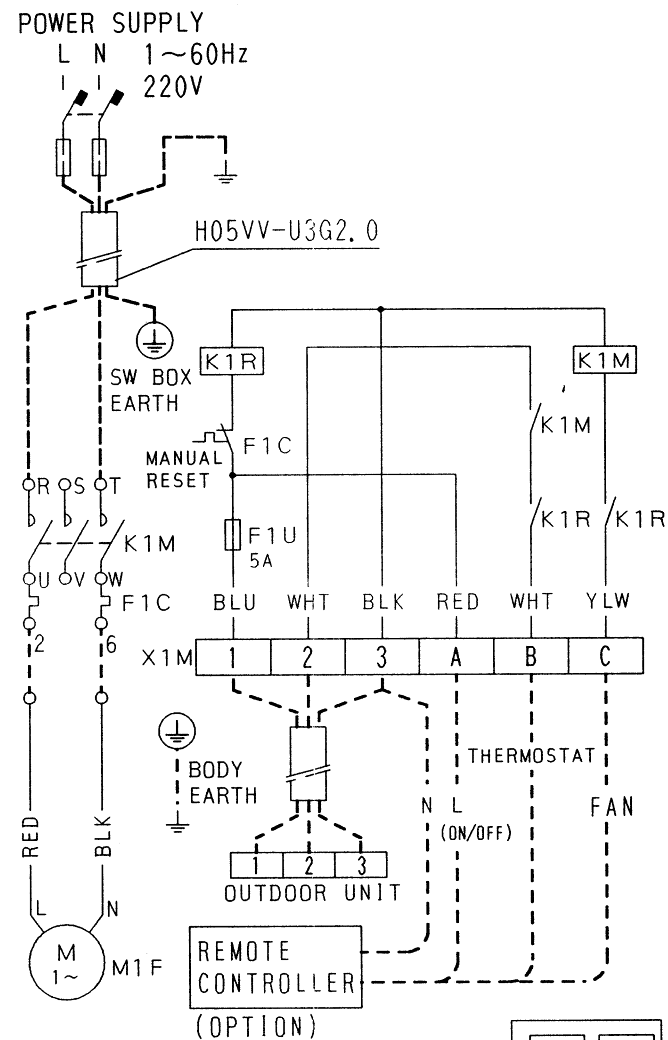


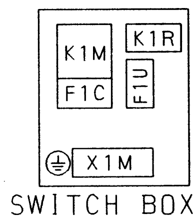
Notes
1) ——— Line voltage wiring
——— Control circuit wiring
2) All wiring, components and materials to be procured on the site must comply with the applicable local and national codes.
3) Use copper conductor only.
4) As for details, see wiring diagrams.
5) Install fuse and mainswitch for safety.
6) All field wiring and components must be provided by a licensed electrician.
7) Unit shall be grounded in compliance with the applicable local and national codes.
8) Wiring shown are general points-of-connection guides only and are not intended for or to include all details for a specific installation.
9) Never share a common power source with other equipment.

(P1393)

2.2 60Hz

FD03·04KVAL





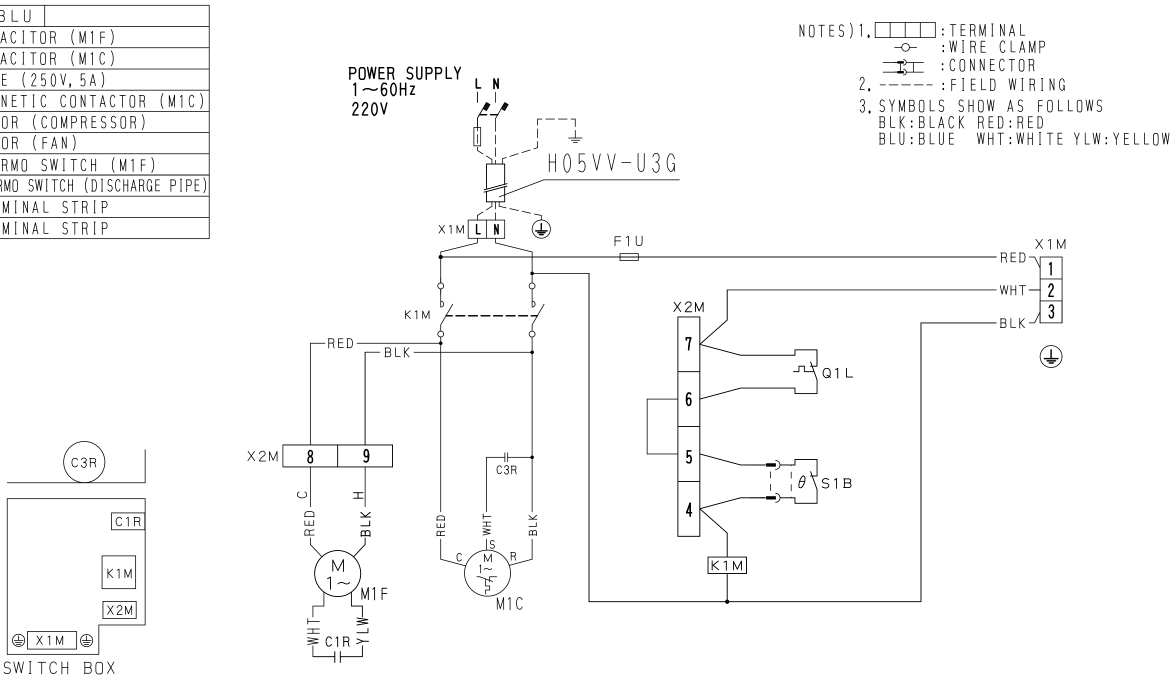
NOTES) 1. ▭▭▭▭ : TERMINAL
-o- : WIRE CLAMP
2. ------ : FIELD WIRING
3. SYMBOLS SHOWN BELOW
BLK:BLACK BLU:BLUE RED:RED
WHT:WHITE YLW:YELLOW

F1C	OVER CURRENT RELAY
F1U	FUSE(5A, 250V)
K1M	MAGNETIC CONTACTOR (M1F)(220V-240V)
K1R	MAGNETIC RELAY(220V-240V)
L-RED	N-BLK
M1F	MOTOR (FAN)(220V)
X1M	TERMINAL STRIP

3D006976

R71FUVAL

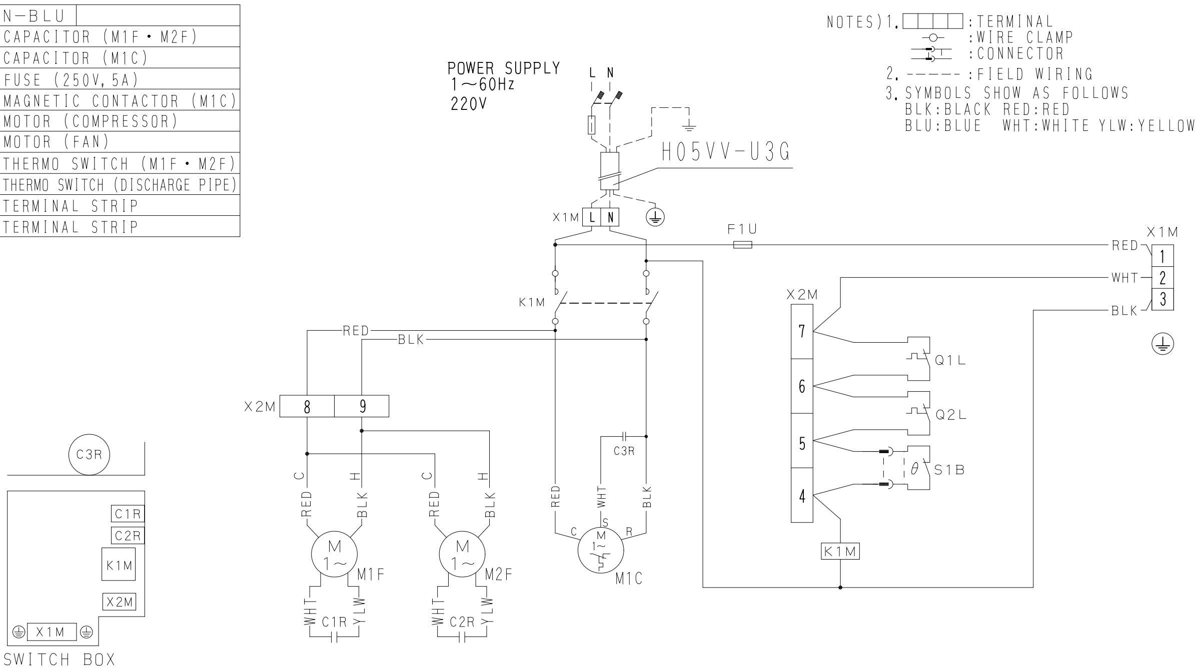
L-RED	N-BLU
C1R	CAPACITOR (M1F)
C3R	CAPACITOR (M1C)
F1U	FUSE (250V, 5A)
K1M	MAGNETIC CONTACTOR (M1C)
M1C	MOTOR (COMPRESSOR)
M1F	MOTOR (FAN)
Q1L	THERMO SWITCH (M1F)
S1B	THERMO SWITCH (DISCHARGE PIPE)
X1M	TERMINAL STRIP
X2M	TERMINAL STRIP



3D005375C

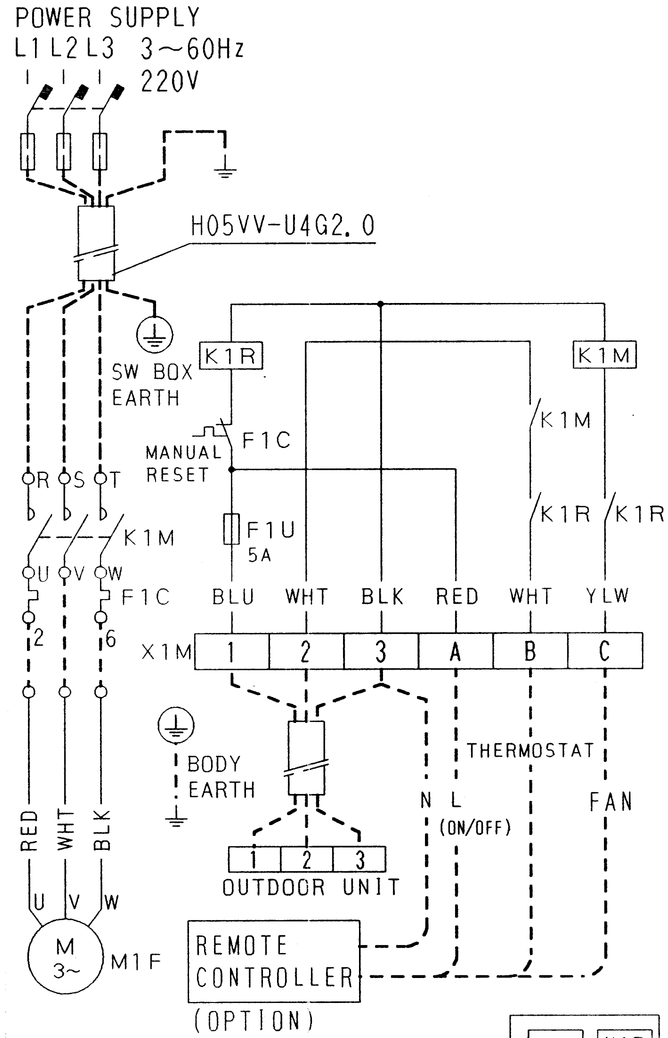
R100FUVAL

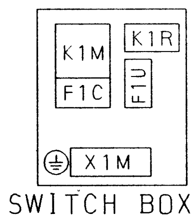
L-RED	N-BLU
C1R·C2R	CAPACITOR (M1F·M2F)
C3R	CAPACITOR (M1C)
F1U	FUSE (250V, 5A)
K1M	MAGNETIC CONTACTOR (M1C)
M1C	MOTOR (COMPRESSOR)
M1F·M2F	MOTOR (FAN)
Q1L·Q2L	THERMO SWITCH (M1F·M2F)
S1B	THERMO SWITCH (DISCHARGE PIPE)
X1M	TERMINAL STRIP
X2M	TERMINAL STRIP



3D005376C

FD05KTAL



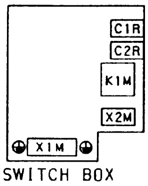


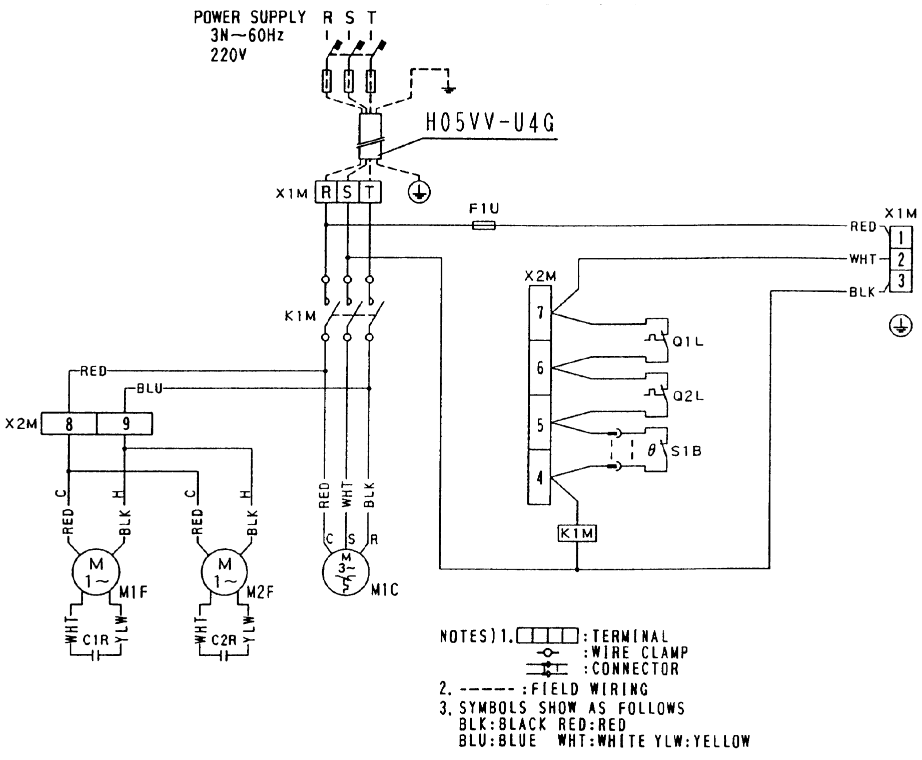
NOTES) 1. ☐☐☐☐ : TERMINAL
-o- : WIRE CLAMP
2. ------ : FIELD WIRING
3. SYMBOLS SHOWN BELOW
BLK:BLACK BLU:BLUE RED:RED
WHT:WHITE YLW:YELLOW

F1C	OVER CURRENT RELAY	
F1U	FUSE(5A, 250V)	
K1M	MAGNETIC CONTACTOR (M1F)(220V-240V)	
K1R	MAGNETIC RELAY(220V-240V)	
L1-RED	L2-WHT	L3-BLK
M1F	MOTOR (FAN)(220V)	
X1M	TERMINAL STRIP	

3D006975

R125FUTAL

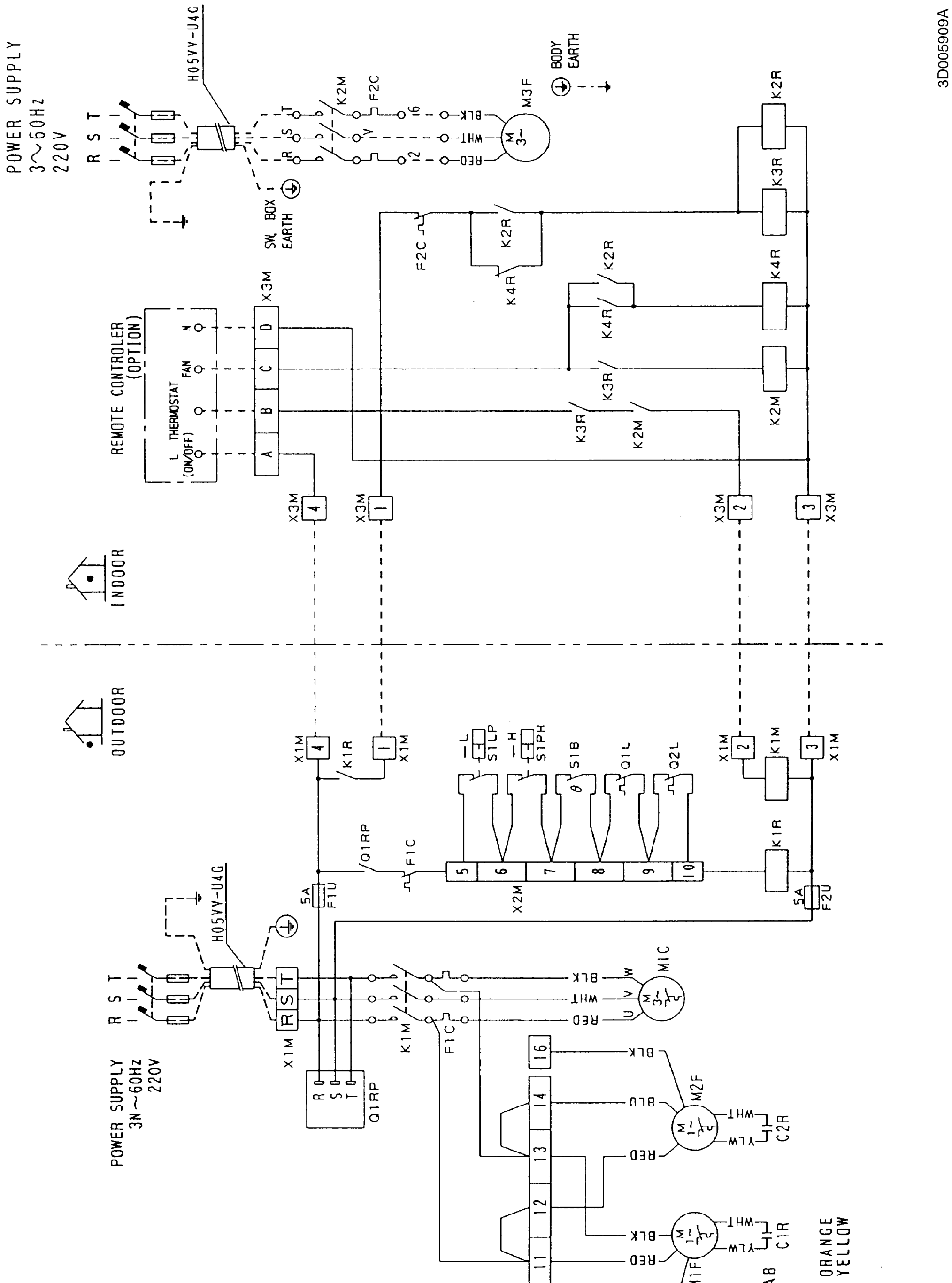




R-RED	S-WHT	T-BLK
C1R·C2R	CAPACITOR (M1F·M2F)	
F1U	FUSE (250V, 5A)	
K1M	MAGNETIC CONTACTOR (M1C)	
M1C	MOTOR (COMPRESSOR)	
M1F·M2F	MOTOR (FAN)	
Q1L·Q2L	THERMO SWITCH (M1F·M2F)	
S1B	THERMO SWITCH (DISCHARGE PIPE)	
X1M	TERMINAL STRIP	
X2M	TERMINAL STRIP	

3D005377A

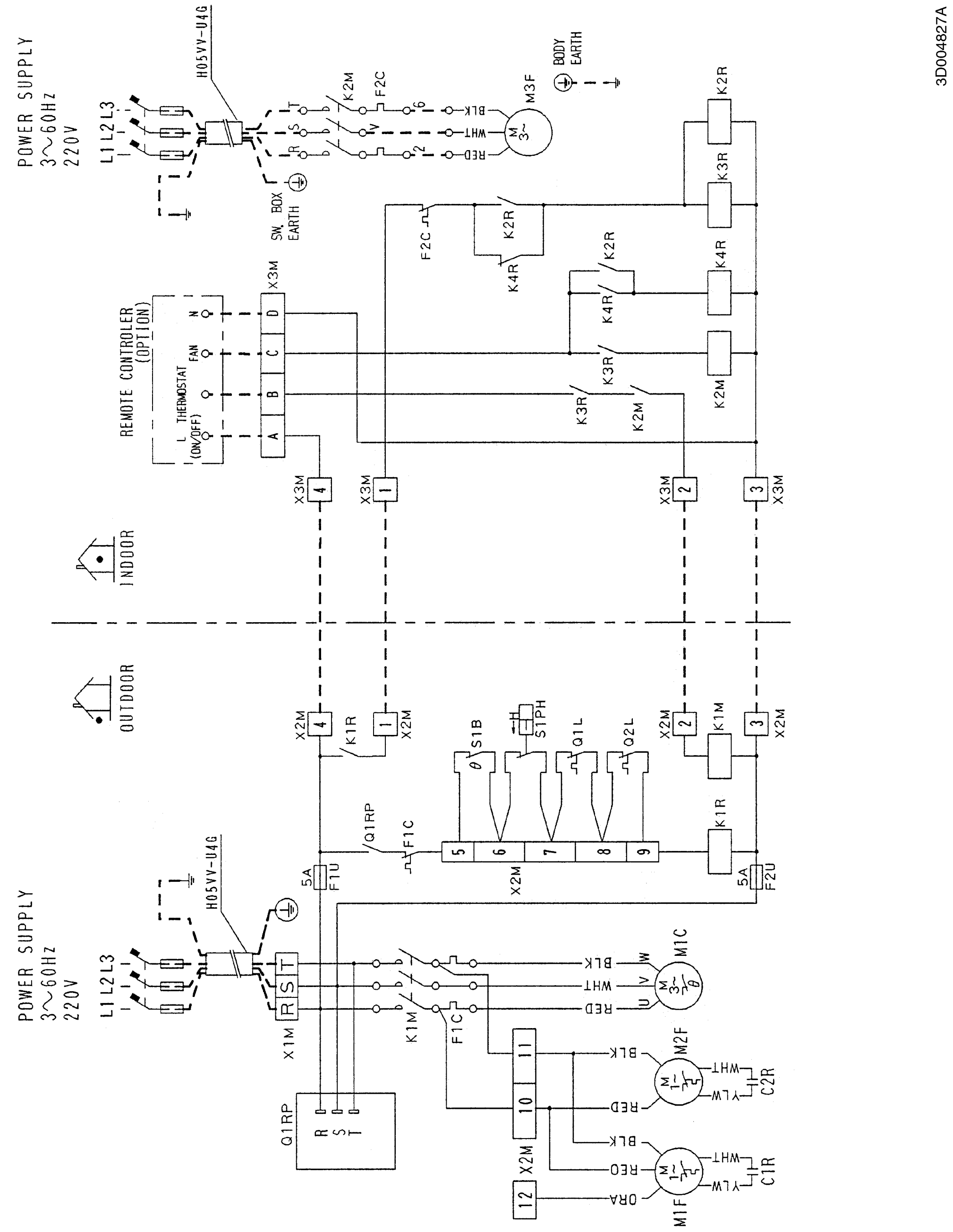
FD06KTAL+RU06KTAL



A-BLU	B-WHT	C-YLW	D-BLK
R-RED	S-WHT	T-BLK	
1-RED	2-WHT	3-BLK	4-BLU
5-RED	6-	7-	8-
9-	10-GRY	11-RED	12-RED
13-BLK	14-BLU	15-	16-
C1R·C2R	CAPACITOR (M1F·M2F)		
F1C	OVERCURRENT RELAY(M1C)		
F2C	OVERCURRENT RELAY(M3F)		
F1U·F2U	FUSE (250V 5A)		
K1M	MAGNETIC CONTACTOR(M1C)		
K2M	MAGNETIC CONTACTOR(M3F)		
K1R	MAGNETIC RELAY(ALARM)		
K2R·K3R	MAGNETIC RELAY(ALARM)		
K4R	MAGNETIC RELAY(OPERATION)		
M1C	MOTOR (COMPRESSOR)		
M1F·M2F	MOTOR (OUTDOOR FAN)		
M3F	MOTOR (INDOOR FAN)		
Q1L·Q2L	THERMO SWITCH (M1F·M2F)		
Q1RP	REVERSE PHASE PROTECTOR		
S1B	THERMO SWITCH (DISCHARGE PIPE)		
S1PH	PRESSURE SWITCH (HIGH)		
S1LP	PRESSURE SWITCH (LOW)		
X1M·X2M	TERMINAL STRIP(OUTDOOR UNIT)		
X3M	TERMINAL STRIP(INDOOR UNIT)		

NOTES) 1. □□□ : TERMINAL STRIP, -o- : WIRE CLAMP, -⊥- : TAB
2. ------ : FIELD WIRING
3. SYMBOLS SHOW AS FOLLOWS
BLK:BLACK RED:RED ORA:ORANGE
BLU:BLUE WHT:WHITE YLW:YELLOW
GRY:GRAY

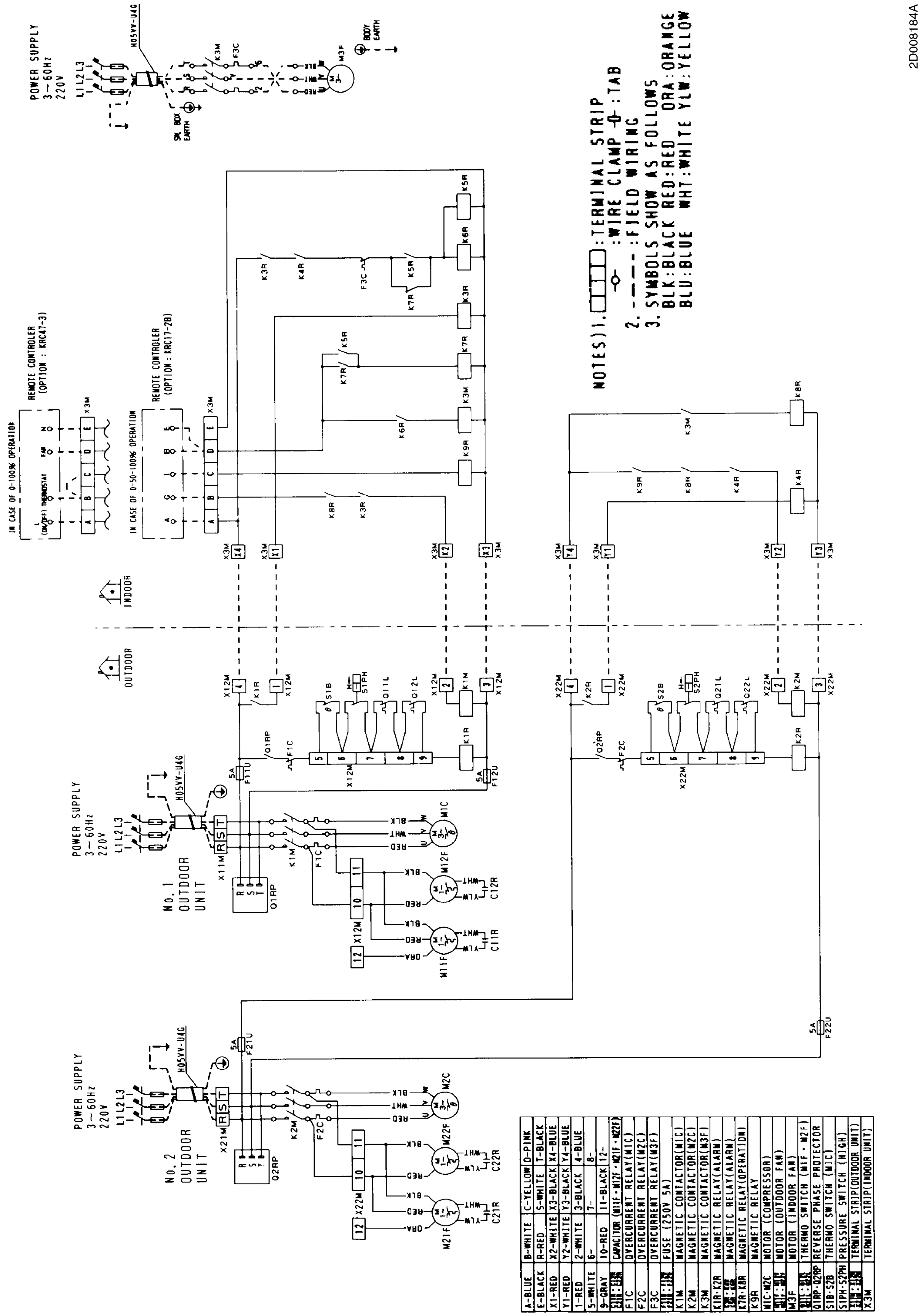
FD08KTAL+RU08KTAL / FD10KTAL+RU10KTAL



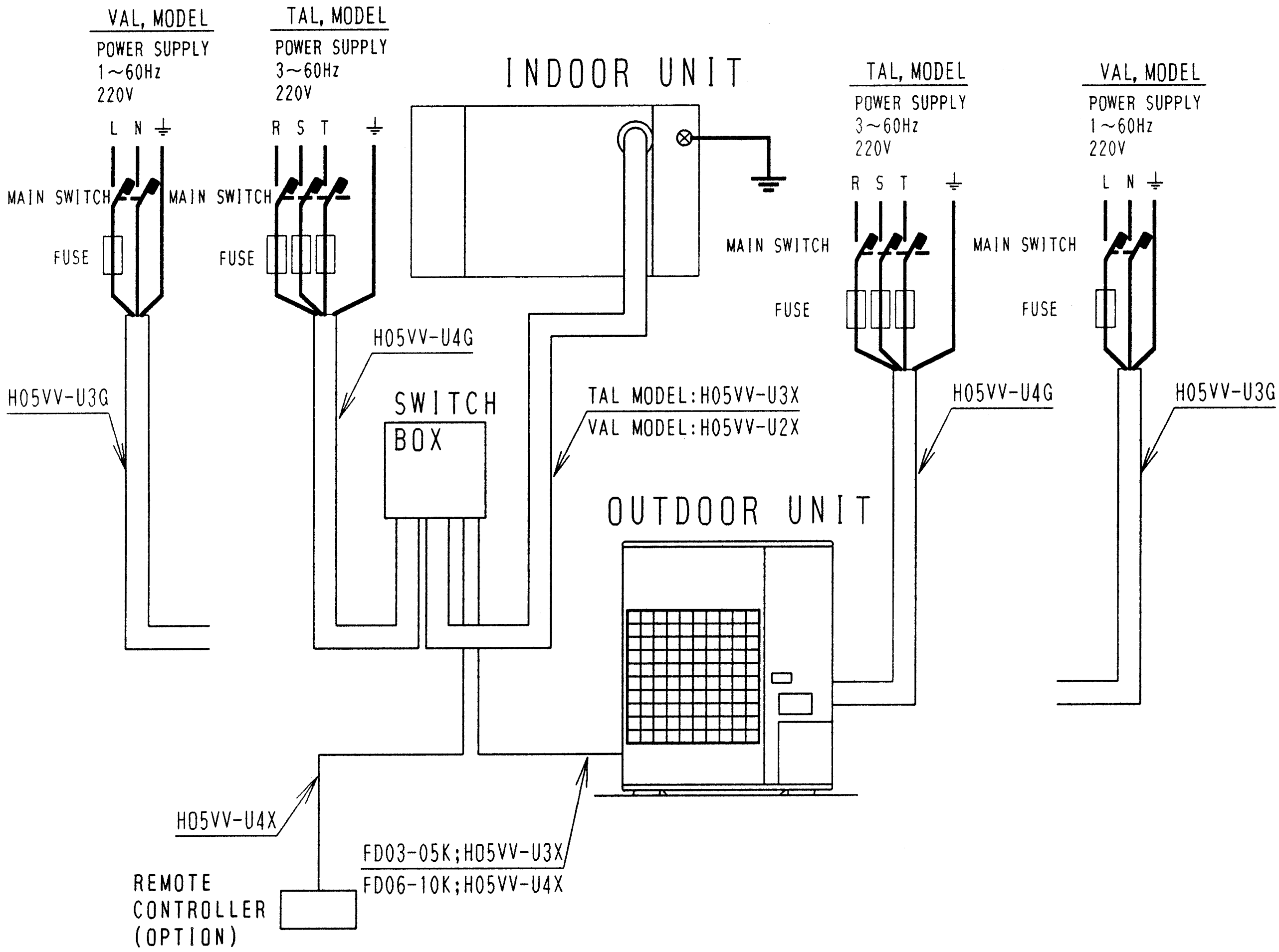
A-BLUE	B-WHITE	C-YELLOW	D-BLACK
R-RED	S-WHITE	T-BLACK	
1-RED	2-WHITE	3-BLACK	4-BLUE
5-WHITE	6-	7-	8-
9-GRAY	10-RED	11-BLACK	12-
C1R·C2R	CAPACITOR (M1F · M2F)		
F1C	OVERCURRENT RELAY(M1C)		
F2C	OVERCURRENT RELAY(M3F)		
F1U·F2U	FUSE (250V 5A)		
K1M	MAGNETIC CONTACTOR(M1C)		
K2M	MAGNETIC CONTACTOR(M3F)		
K1R	MAGNETIC RELAY(ALARM)		
K2R·K3R	MAGNETIC RELAY(ALARM)		
K4R	MAGNETIC RELAY(OPERATION)		
M1C	MOTOR (COMPRESSOR)		
M1F·M2F	MOTOR (OUTDOOR FAN)		
M3F	MOTOR (INDOOR FAN)		
Q1L·Q2L	THERMO SWITCH (M1F · M2F)		
Q1RP	REVERSE PHASE PROTECTOR		
S1B	THERMO SWITCH (M1C)		
S1PH	PRESSURE SWITCH (HIGH)		
X1M·X2M	TERMINAL STRIP(OUTDOOR UNIT)		
X3M	TERMINAL STRIP(INDOOR UNIT)		

NOTES) 1. ▭▭▭▭ :TERMINAL STRIP
-○- :WIRE CLAMP -▯- :TAB
2. ------ :FIELD WIRING
3. SYMBOLS SHOW AS FOLLOWS
BLK:BLACK RED:RED ORA:ORANGE
BLU:BLUE WHT:WHITE YLW:YELLOW

FD15KTAL+RU08KTAL×2 / FD20KTAL+RU10KTAL×2



FD03, 04KVAL / FD05~10KTAL



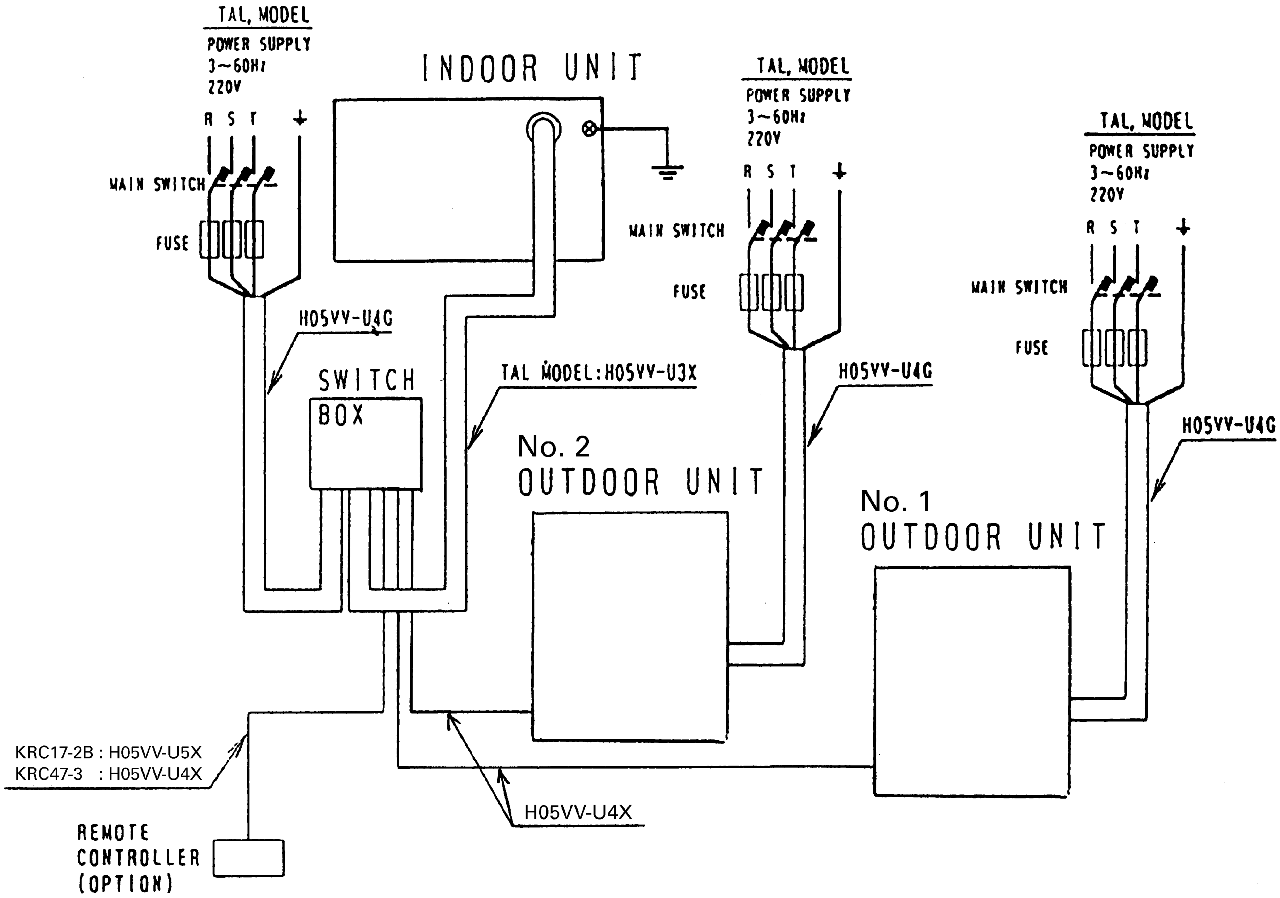
Notes 1) ——— Line voltage wiring

——— Control circuit wiring

2) All wiring, components and materials to be procured on the site must comply with the applicable local and national codes.
3) Use copper conductor only.
4) As for details, see wiring diagrams.
5) Install fuse and mainswitch for safety.
6) All field wiring and components must be provided by a licensed electrician.
7) Unit shall be grounded in compliance with the applicable local and national codes.
8) Wiring shown are general points-of-connection guides only and are not intended for or to include all details for a specific installation.
9) Never share a common power source with other equipment.

4D008264

FD15·20KTAL



Notes
1) ━━━━ Line voltage wiring
   ──── Control circuit wiring
2) All wiring, components and materials to be procured on the site must comply with the applicable local and national codes.
3) Use copper conductor only.
4) As for details, see wiring diagrams.
5) Install fuse and mainswitch for safety.
6) All field wiring and components must be provided by a licensed electrician.
7) Unit shall be grounded in compliance with the applicable local and national codes.
8) Wiring shown are general points-of-connection guides only and are not intended for or to include all details for a specific installation.
9) Never share a common power source with other equipment.

(P1394)

Packaged Air Conditioners Duct Connection Type (High static Pressure Application) FDY-K(A) Series — Heat Pump —

Model Series

Class	6HP	8HP	10HP	15HP	20HP
Indoor Units	FDY06K(A)	FDY08K(A)	FDY10K(A)	FDY15K(A)	FDY20K(A)
Outdoor Units	RY140KU	RY200KU	RY250KU	RY200KU×2	RY250KU×2

Part 1
Model Name and Power Supply

1. Model Series and Nomenclature

1.1 High Static Pressure Type

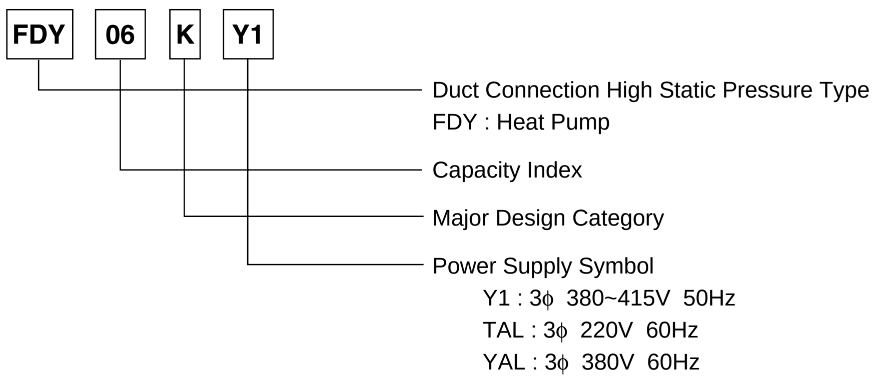
1.1.1 Model Series and Power Supply

Symbol		Power Supply	Indoor Unit	Outdoor Unit
50Hz	Y1	3ϕ, 380~415V, 50Hz (Indoor Fan Motor 3 wires) (Outdoor Unit 4 wires)	FDY06K(A)Y1	RY140KUY1
			FDY08K(A)Y1	RY200KUY1
			FDY10K(A)Y1	RY250KUY1
			FDY15K(A)Y1	RY200KUY1×2
			FDY20K(A)Y1	RY250KUY1×2
60Hz	TAL	3ϕ, 220V, 60Hz	FDY08K(A)TAL	RY200KUTAL
			FDY10K(A)TAL	RY250KUTAL
			FDY15K(A)TAL	RY200KUTAL×2
			FDY20K(A)TAL	RY250KUTAL×2
	YAL	3ϕ, 380V, 60Hz (Indoor Fan Motor 3 wires) (Outdoor Unit 4 wires)	FDY08K(A)YAL	RY200KUYAL
			FDY10K(A)YAL	RY250KUYAL
			FDY15K(A)YAL	RY200KUYAL×2
			FDY20K(A)YAL	RY250KUYAL×2

Note: Power Supply Intake: Indoor Fan Motor and Outdoor Units.

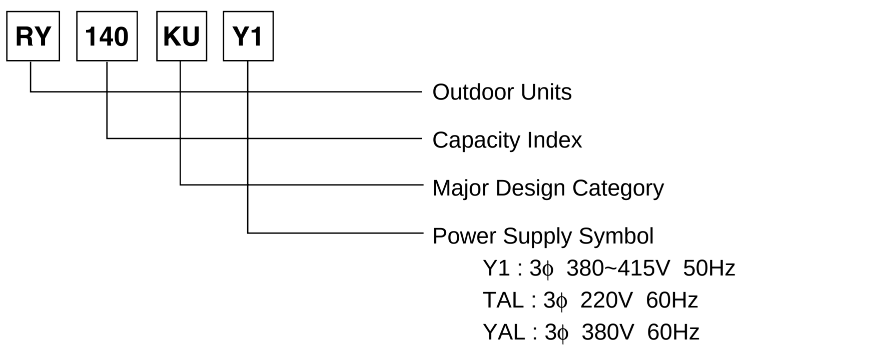
1.1.2 Nomenclature

Indoor Units



(P1015)

Outdoor Units



(P1016)

2. External Appearance

2.1 External Appearance

2.1.1 Indoor Units


FDY06K(A)


FDY08K(A)


FDY10K(A)


FDY15K(A)


FDY20K(A)

2.1.2 Remote Controller


Wired Type
BRC1B62


Wired Type
BRC1C61


Wireless Type
BRC4C62


Signal Receiving Unit
(Separate Type)

2.1.3 Outdoor Units


RY140KU


RY200KU


RY250KU

Part 2 Functions

1. Functions

1.1 Functions

Functions	Duct Connection High Static Pressure Type FDY-K	Notes
Fan Operation Mode	○	Fan only operation
LCD Wired Remote Controller	○	
Hot Start	○	
Timer Selector	○	
Automatic Cool / Heat Change Over	○	FDY06,08,10KA Only
Static Pressure Change Over	○	Motor Pulley Exchange
Self Diagnosis Function	○	
Chargeless Length	30m	FDY06K
	5m	FDY08~20K
Anti-corrosion treatment of outdoor heat exchanger fins	○	
Set Back Time Clock	○	
Control by 2 Remote Controllers	○	

○: Function exists

Part 3
Specifications

1. Specifications

1.1 K Series 50Hz

Models						
Models	Indoor Units			**FDY06KY1**	**FDY08KY1**	**FDY10KY1**
	Outdoor Units			**RY140KUY1**	**RY200KUY1**	**RY250KUY1**
★1, ★2 Cooling Capacity (1)/(2)/(3)			kW	14.5/14.2/14.2	22.5/22.2/22.2	27.6/27.1/27.1
			Btu/h	49,500/48,500/48,500	76,800/75,700/75,700	94,200/92,500/92,500
			kcal/h	12,500/12,200/12,200	19,300/19,100/19,100	23,700/23,300/23,300
★1, ★3 Heating Capacity (1)/(2)/(3)			kW	15.3/15.3/15.3	23.1/23.2/23.1	29.4/29.5/29.4
			Btu/h	52,200/52,200/52,200	78,800/79,200/78,800	100,300/100,700/100,300
			kcal/h	13,200/13,200/13,200	19,900/20,000/19,900	25,300/25,400/25,300
Indoor Units				**FDY06KY1**	**FDY08KY1**	**FDY10KY1**
Dimensions		H×W×D	mm	450×1,130×850 (Without Control Box)	500×1,130×850 (Without Control Box)	500×1,330×850 (Without Control Box)
Coil	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)		
	Row×Stages×Fin Pitch			2×24×2.0	3×22×2.0	3×22×2.0
	Face Area		m^2	0.491	0.443	0.540
Fan	Type			Sirocco Fan	Sirocco Fan	Sirocco Fan
	Drive			Belt Drive	Belt Drive	Belt Drive
	Motor Output		kW	0.75	1.5	1.5
	Air Flow Rate		m^3/min	52	68	83
External Static Pressure			Pa	108	118	118
Sound Pressure Level			dB (A)	51	51	53
Machine Weight			kg	80	94	105
Piping Connections		Liquid	mm	ϕ9.5 (Brazing)	ϕ12.7 (Brazing)	ϕ15.9 (Brazing)
		Gas	mm	ϕ15.9 (Brazing)	ϕ25.4 (Brazing)	ϕ28.6 (Brazing)
		Drain	in.	PT3/4 (Internal Thread)	PT3/4 (Internal Thread)	PT3/4 (Internal Thread)
Remote Controller		Wired		BRC1C51 (Standard Accessories)	BRC1C51 (Standard Accessories)	BRC1C51 (Standard Accessories)
		Wireless		—	—	—
Outdoor Units				**RY140KUY1**	**RY200KUY1**	**RY250KUY1**
Color				Ivory	Ivory	Ivory
Dimensions		H×W×D	mm	1,345×880×370	1,220×1,280×690	1,440×1,280×690
Coil	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)		
	Row×Stages×Fin Pitch			2×60×2.0	2×40×2.0	2×50×2.0
	Face Area		m^2	1.088	1.57	1.97
Comp.	Model			JT170BC-YE	JT236D-P1YE	JT335D-P1YE
	Type			Hermetically Sealed Scroll Type		
	Motor Output		kW	4.5	5.5	9.0
Fan	Model			P45J11SM	P52H11SM	P52H11SM
	Type			Propeller	Propeller	Propeller
	Motor Output		W	90+80	230+190	230+190
	Air Flow Rate		m^3/min	101	150	175
Machine Weight			kg	112	180	206
Piping Connections		Liquid	mm	ϕ9.5 (Flare)	ϕ12.7 (Flare)	ϕ15.9 (Flare)
		Gas	mm	ϕ19.1 (Flare)	ϕ25.4 (Flange)	ϕ28.6 (Flange)
		Drain	mm	ϕ26.0 (Hole)	—	—
Safety Devices				Thermal protector for outdoor fan motor. High pressure switch. Low pressure switch. Reverse phase protector. Over current relay (compressor and indoor fan motor). Fuse.	Thermal protector for compressor and outdoor fan motor. High pressure switch. Low pressure switch. Reverse phase protector. Over current relay (compressor and indoor fan motor). Fuse	
Capacity Step			%	100 – 0	100 – 0	100 – 0
Refrigerant Control				Expansion Valve (Electronic Type)	Capillary Tube	
Ref. Piping	Standard Length		m	5	5	5
	Max. Length		m	50 (Equivalent length 70m)	50 (Equivalent length 70m)	50 (Equivalent length 70m)
	Max. Height Difference		m	30	30	30
Refrigerant	Model			R22	R22	R22
	Charge		kg	3.9 (Charged for 30m)	4.0 (Charged for 5m)	5.5 (Charged for 5m)
Ref. Oil	Model			SUNISO 4GSDID – K	SUNISO 4GSDID – K	SUNISO 4GSDID – K
	Charge		L	1.6	3.0	3.0
Drawing No.				4D029830A	4D024538A	

Notes: ★1. Nominal capacities are based on the following conditions.

	Cooling	Heating	Piping Length	Hz-Volts	Standard
(1)	Indoor: 27°C(81°F)DB, 19.5°C(67°F)WB Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 21°C(70°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	5m (Horizontal)	50Hz-380V	—
(2)	Indoor: 27°C(81°F)DB, 19.0°C(66°F)WB Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 20°C(68°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	5m (Horizontal)	50Hz-380V	—
(3)	Indoor: 27°C(81°F)DB, 19.0°C(66°F)WB Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 21°C(70°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	7.5m (Horizontal)	50Hz-415V	AS 1861

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m^3/min×35.3

★2. Cooling capacities are gross, not including a deduction for cooling for indoor fan motor heat.
★3. Heating capacities are net, including an addition for heating for indoor fan motor heat.
4. In case of drain piping for outdoor unit, drain piping kit (option) is needed. (RY140KUY1)

Models	Indoor Units			FDY15KY1	FDY20KY1
	Outdoor Units			RY200KUY1×2 Units	RY250KUY1×2 Units
★1, ★2 Cooling Capacity (1)/(2)/(3)			kW	44.0/43.5/43.5	53.9/53.0/53.0
			Btu/h	150,000/148,000/148,000	184,000/181,000/181,000
			kcal/h	37,800/37,400/37,400	46,400/45,600/45,600
★1, ★3 Heating Capacity (1)/(2)/(3)			kW	44.6/44.8/44.6	56.6/56.8/56.6
			Btu/h	152,000/153,000/152,000	193,000/194,000/193,000
			kcal/h	38,400/38,500/38,400	48,700/48,800/48,700
Indoor Units				**FDY15KY1**	**FDY20KY1**
Dimensions		H×W×D	mm	625×1,620×850	625×1,980×850
Coil	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch			3×26×2.0	3×26×2.0
	Face Area		m²	0.784	0.990
Fan	Type			Sirocco Fan	Sirocco Fan
	Drive			Belt Drive	Belt Drive
	Motor Output		kW	2.2	3.7
	Air Flow Rate		m³/min	136	166
External Static Pressure			Pa	147	147
Sound Pressure Level			dB (A)	58	60
Machine Weight			kg	161	187
Piping Connections		Liquid	mm	ϕ12.7 (Brazing)	ϕ15.9 (Brazing)
		Gas	mm	ϕ25.4 (Brazing)	ϕ28.6 (Brazing)
		Drain	in.	PT1 (Internal Thread)	PT1 (Internal Thread)
Remote Controller		Wired		BRC1C51	BRC1C51
		Wireless		—	—
Outdoor Units				**RY200KUY1×2 Units**	**RY250KUY1×2 Units**
Color				Ivory	Ivory
Dimensions ★4		H×W×D	mm	1,220×1,280×690	1,440×1,280×690
Coil ★4	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch			2×40×2.0	2×50×2.0
	Face Area		m²	1.57	1.97
Comp. ★4	Model			JT236D-P1YE	JT335D-P1YE
	Type			Hermetically Sealed Scroll Type	
	Motor Output		kW	5.5	9.0
Fan ★4	Model			P52H11SM	P52H11SM
	Type			Propeller	Propeller
	Motor Output		W	230+190	230+190
	Air Flow Rate		m³/min	150	175
Machine Weight ★4			kg	180	206
Piping Connections ★4		Liquid	mm	ϕ12.7 (Flare)	ϕ15.9 (Flare)
		Gas	mm	ϕ25.4 (Flange)	ϕ28.6 (Flange)
		Drain	mm	—	—
Safety Devices				Thermal protector for compressor and outdoor fan motor. High pressure switch. Low pressure switch. Reverse phase protector. Over current relay (compressor and indoor fan motor). Fuse.	
Capacity Step			%	100 – 50 – 0	100 – 50 – 0
Refrigerant Control				Capillary Tube	
Ref. Piping	Standard Length		m	5	5
	Max. Length		m	50 (Equivalent length 70m)	50 (Equivalent length 70m)
	Max. Height Difference		m	30	30
Refrigerant	Model			R22	R22
	Charge		kg	4.0 (Charged for 5m) × 2 Units	5.5 (Charged for 5m) × 2 Units
Ref. Oil	Model			SUNISO 4GSDID – K	SUNISO 4GSDID – K
	Charge		L	3.0 × 2 Units	3.0 × 2 Units
Drawing No.				4D029840	

Notes:

★1. Nominal capacities are based on the following conditions.

	Cooling	Heating	Piping Length	Hz-Volts	Standard
(1)	Indoor: 27°C(81°F)DB, 19.5°C(67°F)WB	Indoor: 21°C(70°F)DB	5m (Horizontal)	50Hz-380V	—
	Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Outdoor: 7°C(45°F)DB, 6°C(43°F)WB			
(2)	Indoor: 27°C(81°F)DB, 19.0°C(66°F)WB	Indoor: 20°C(68°F)DB	5m (Horizontal)	50Hz-380V	—
	Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Outdoor: 7°C(45°F)DB, 6°C(43°F)WB			
(3)	Indoor: 27°C(81°F)DB, 19.0°C(66°F)WB	Indoor: 21°C(70°F)DB	7.5m (Horizontal)	50Hz-415V	AS 1861
	Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Outdoor: 7°C(45°F)DB, 6°C(43°F)WB			

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

★2. Cooling capacities are gross, not including a deduction for cooling for indoor fan motor heat.
★3. Heating capacities are net, including an addition for heating for indoor fan motor heat.
★4. The specification of the outdoor unit shows only one unit.

1.2 K Series 60Hz

Models	**Indoor Units**	**TAL**	**FDY08KTAL**	**FDY10KTAL**
		YAL	**FDY08KYAL**	**FDY10KYAL**
	Outdoor Units	**TAL**	**RY200KUTAL**	**RY250KUTAL**
		YAL	**RY200KUYAL**	**RY250KUYAL**
★1, ★2 Cooling Capacity (1)/(2)/(3)		kW	22.5/22.2/22.2	27.6/27.1/27.1
		Btu/h	76,800/75,700/75,700	94,200/92,500/92,500
		kcal/h	19,300/19,100/19,100	23,700/23,300/23,300
★1, ★3 Heating Capacity (1)/(2)/(3)		kW	23.1/23.2/23.1	29.4/29.5/29.4
		Btu/h	78,800/79,200/78,800	100,300/100,700/100,300
		kcal/h	19,900/20,000/19,900	25,300/25,400/25,300
Indoor Units		**TAL**	**FDY08KTAL**	**FDY10KTAL**
		YAL	**FDY08KYAL**	**FDY10KYAL**
Dimensions	H×W×D	mm	500×1,130×850 (Without Control Box)	500×1,330×850 (Without Control Box)
Coil	Type		Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch		3×22×2.0	3×22×2.0
	Face Area	m²	0.443	0.540
Fan	Type		Sirocco Fan	Sirocco Fan
	Drive		Belt Drive	Belt Drive
	Motor Output	kW	1.5	1.5
	Air Flow Rate	m³/min	68	83
External Static Pressure		Pa	118	118
Sound Pressure Level		dB (A)	51	53
Machine Weight		kg	94	105
Piping Connections	Liquid	mm	ϕ12.7 (Brazing)	ϕ15.9 (Brazing)
	Gas	mm	ϕ25.4 (Brazing)	ϕ28.6 (Brazing)
	Drain	in.	PT3/4 (Internal Thread)	PT3/4 (Internal Thread)
Remote Controller	Wired		BRC1C51 (Standard Accessories)	BRC1C51 (Standard Accessories)
	Wireless		—	—
Outdoor Units		**TAL**	**RY200KUTAL**	**RY250KUTAL**
		YAL	**RY200KUYAL**	**RY250KUYAL**
Color			Ivory	Ivory
Dimensions	H×W×D	mm	1,220×1,280×690	1,440×1,280×690
Coil	Type		Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch		2×40×2.0	2×50×2.0
	Face Area	m²	1.57	1.97
Comp.	Model	TAL	JT212D-P1	JT300D-P1
		YAL	JT212D-P1YH	JT300D-P1YH
	Type		Hermetically Sealed Scroll Type	
	Motor Output	kW	5.5	7.5
Fan	Model		P52H11SM	P52H11SM
	Type		Propeller	Propeller
	Motor Output	W	230+190	230+190
	Air Flow Rate	m³/min	160	190
Machine Weight		kg	179	204
Piping Connections	Liquid	mm	ϕ12.7 (Flare)	ϕ15.9 (Flare)
	Gas	mm	ϕ25.4 (Flange)	ϕ28.6 (Flange)
	Drain	mm	—	—
Safety Devices			Thermal protector for compressor and outdoor fan motor. High pressure switch. Low pressure switch. Reverse phase protector. Over current relay (compressor and indoor fan motor). Fuse	
Capacity Step		%	100 – 0	100 – 0
Refrigerant Control			Capillary Tube	
Ref. Piping	Standard Length	m	5	5
	Max. Length	m	50 (Equivalent length 70m)	50 (Equivalent length 70m)
	Max. Height Difference	m	30	30
Refrigerant	Model		R22	R22
	Charge	kg	4.0 (Charged for 5m)	5.5 (Charged for 5m)
Ref. Oil	Model		SUNISO 4GSDID – K	SUNISO 4GSDID – K
	Charge	L	3.0	3.0
Drawing No.			4D029831	

Notes:

★1. Nominal capacities are based on the following conditions.

	Cooling	Heating	Piping Length	Hz-Volts	Standard
(1)	Indoor: 27°C(81°F)DB, 19.5°C(67°F)WB Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 21°C(70°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	5m (Horizontal)	60Hz-220V 60Hz-380V	—
(2)	Indoor: 27°C(81°F)DB, 19.0°C(66°F)WB Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 20°C(68°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	5m (Horizontal)	60Hz-220V 60Hz-380V	—
(3)	Indoor: 29°C(84°F)DB, 19.0°C(66°F)WB Outdoor: 46°C(115°F)DB, 24°C(75°F)WB	Indoor: 21°C(70°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	7.5m (Horizontal)	60Hz-220V 60Hz-380V	SSA 385/ 386

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

★2. Cooling capacities are gross, not including a deduction for cooling for indoor fan motor heat.
★3. Heating capacities are net, including an addition for heating for indoor fan motor heat.

Models				
Models	Indoor Units	TAL	**FDY15KTAL**	**FDY20KTAL**
		YAL	**FDY15KYAL**	**FDY20KYAL**
	Outdoor Units	TAL	**RY200KUTAL×2 Units**	**RY250KUTAL×2 Units**
		YAL	**RY200KUYAL×2 Units**	**RY250KUYAL×2 Units**
★1, ★2 Cooling Capacity (1)/(2)/(3)		kW	44.0/43.5/38.7	53.9/53.0/47.3
		Btu/h	150,000/148,000/132,000	184,000/181,000/161,000
		kcal/h	37,800/37,400/33,300	46,400/45,600/40,700
★1, ★3 Heating Capacity (1)/(2)/(3)		kW	44.6/44.8/44.6	56.6/56.8/56.6
		Btu/h	152,000/153,000/152,000	193,000/194,000/193,000
		kcal/h	38,400/38,500/38,400	48,700/48,800/48,700
Indoor Units		TAL	**FDY15KTAL**	**FDY20KTAL**
		YAL	**FDY15KYAL**	**FDY20KYAL**
Dimensions	H×W×D	mm	625×1,620×850	625×1,980×850
Coil	Type		Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch		3×26×2.0	3×26×2.0
	Face Area	m²	0.784	0.990
Fan	Type		Sirocco Fan	Sirocco Fan
	Drive		Belt Drive	Belt Drive
	Motor Output	kW	2.2	3.7
	Air Flow Rate	m³/min	136	166
External Static Pressure		Pa	147	147
Sound Pressure Level		dB (A)	58	60
Machine Weight		kg	161	187
Piping Connections	Liquid	mm	ϕ12.7 (Brazing)	ϕ15.9 (Brazing)
	Gas	mm	ϕ25.4 (Brazing)	ϕ28.6 (Brazing)
	Drain	in.	PT1 (Internal Thread)	PT1 (Internal Thread)
Remote Controller	Wired		BRC1C51	BRC1C51
	Wireless		—	—
Outdoor Units		TAL	**RY200KUTAL×2 Units**	**RY250KUTAL×2 Units**
		YAL	**RY200KUYAL×2 Units**	**RY250KUYAL×2 Units**
Color			Ivory	Ivory
Dimensions ★4	H×W×D	mm	1,220×1,280×690	1,440×1,280×690
Coil ★4	Type		Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch		2×40×2.0	2×50×2.0
	Face Area	m²	1.57	1.97
Comp. ★4	Model	TAL	JT212D-P1	JT300D-P1
		YAL	JT212D-P1YH	JT300D-P1YH
	Type		Hermetically Sealed Scroll Type	
	Motor Output	kW	5.5	7.5
Fan ★4	Model		P52H11SM	P52H11SM
	Type		Propeller	Propeller
	Motor Output	W	230+190	230+190
	Air Flow Rate	m³/min	160	190
Machine Weight ★4		kg	179	204
Piping Connections ★4	Liquid	mm	ϕ12.7 (Flare)	ϕ15.9 (Flare)
	Gas	mm	ϕ25.4 (Flange)	ϕ28.6 (Flange)
	Drain	mm	—	—
Safety Devices			Thermal protector for compressor and outdoor fan motor. High pressure switch. Low pressure switch. Reverse phase protector. Over current relay (compressor and indoor fan motor). Fuse	
Capacity Step		%	100 – 50 – 0	100 – 50 – 0
Refrigerant Control			Capillary Tube	
Ref. Piping	Standard Length	m	5	5
	Max. Length	m	50 (Equivalent length 70m)	50 (Equivalent length 70m)
	Max. Height Difference	m	30	30
Refrigerant	Model		R22	R22
	Charge	kg	4.0 (Charged for 5m) × 2 Units	5.5 (Charged for 5m) × 2 Units
Ref. Oil	Model		SUNISO 4GSDID – K	SUNISO 4GSDID – K
	Charge	L	3.0 × 2 Units	3.0 × 2 Units
Drawing No.			4D029838	

Notes:

★1. Nominal capacities are based on the following conditions.

	Cooling	Heating	Piping Length	Hz-Volts	Standard
(1)	Indoor: 27°C(81°F)DB, 19.5°C(67°F)WB Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 21°C(70°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	5m (Horizontal)	60Hz-220V 60Hz-380V	—
(2)	Indoor: 27°C(81°F)DB, 19.0°C(66°F)WB Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 20°C(68°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	5m (Horizontal)	60Hz-220V 60Hz-380V	—
(3)	Indoor: 29°C(84°F)DB, 19.0°C(66°F)WB Outdoor: 46°C(115°F)DB, 24°C(75°F)WB	Indoor: 21°C(70°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	7.5m (Horizontal)	60Hz-220V 60Hz-380V	SSA 385/386

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

★2. Cooling capacities are gross, not including a deduction for cooling for indoor fan motor heat.
★3. Heating capacities are net, including an addition for heating for indoor fan motor heat.
★4. The specification of the outdoor unit shows only one unit.

1.3 KA Series 50Hz

Models						
Models	Indoor Units			FDY06KAY1	FDY08KAY1	FDY10KAY1
	Outdoor Units			RY140KUY1	RY200KUY1	RY250KUY1
★1, ★2 Cooling Capacity (1)/(2)/(3)			kW	14.5/14.2/14.2	22.5/22.2/22.2	27.6/27.1/27.1
			Btu/h	49,500/48,500/48,500	76,800/75,700/75,700	94,200/92,500/92,500
			kcal/h	12,500/12,200/12,200	19,300/19,100/19,100	23,700/23,300/23,300
★1, ★3 Heating Capacity (1)/(2)/(3)			kW	15.3/15.3/15.3	23.1/23.2/23.1	29.4/29.5/29.4
			Btu/h	52,200/52,200/52,200	78,800/79,200/78,800	100,300/100,700/100,300
			kcal/h	13,200/13,200/13,200	19,900/20,000/19,900	25,300/25,400/25,300
Indoor Units				**FDY06KAY1**	**FDY08KAY1**	**FDY10KAY1**
Dimensions		H×W×D	mm	450×1,130×850 (Without Control Box)	500×1,130×850 (Without Control Box)	500×1,330×850 (Without Control Box)
Coil	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)		
	Row×Stages×Fin Pitch			2×24×2.0	3×22×2.0	3×22×2.0
	Face Area		m²	0.491	0.443	0.540
Fan	Type			Sirocco Fan	Sirocco Fan	Sirocco Fan
	Drive			Belt Drive	Belt Drive	Belt Drive
	Motor Output		kW	0.75	1.5	1.5
	Air Flow Rate ★5		m³/min	52-52	68-68	83-83
External Static Pressure			Pa	108	118	118
Sound Pressure Level ★5			dB (A)	51-51	51-51	53-53
Machine Weight			kg	80	94	105
Piping Connections		Liquid	mm	φ9.5 (Brazing)	φ12.7 (Brazing)	φ15.9 (Brazing)
		Gas	mm	φ15.9 (Brazing)	φ25.4 (Brazing)	φ28.6 (Brazing)
		Drain	in.	PT3/4 (Internal Thread)	PT3/4 (Internal Thread)	PT3/4 (Internal Thread)
Remote Controller (Option)		Wired		BRC1C61	BRC1C61	BRC1C61
		Wireless		BRC4C62	BRC4C62	BRC4C62
Outdoor Units				**RY140KUY1**	**RY200KUY1**	**RY250KUY1**
Color				Ivory	Ivory	Ivory
Dimensions		H×W×D	mm	1,345×880×370	1,220×1,280×690	1,440×1,280×690
Coil	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)		
	Row×Stages×Fin Pitch			2×60×2.0	2×40×2.0	2×50×2.0
	Face Area		m²	1.088	1.57	1.97
Comp.	Model			JT170BC-YE	JT236D-P1YE	JT335D-P1YE
	Type			Hermetically Sealed Scroll Type		
	Motor Output		kW	4.5	5.5	9.0
Fan	Model			P45J11SM	P52H11SM	P52H11SM
	Type			Propeller	Propeller	Propeller
	Motor Output		W	90+80	230+190	230+190
	Air Flow Rate (C/H) ★5		m³/min	101/91-103/93	150/138-154/142	175/161-179-165
Machine Weight			kg	112	180	206
Piping Connections		Liquid	mm	φ9.5 (Flare)	φ12.7 (Flare)	φ15.9 (Flare)
		Gas	mm	φ19.1 (Flare)	φ25.4 (Flange)	φ28.6 (Flange)
		Drain	mm	φ26.0 (Hole)	—	—
Safety Devices				Thermal protector for outdoor fan motor. High pressure switch. Low pressure switch. Reverse phase protector. Over current relay (compressor and indoor fan motor). Fuse.	Thermal protector for compressor and outdoor fan motor. High pressure switch. Low pressure switch. Reverse phase protector. Over current relay (compressor and indoor fan motor). Fuse.	
Capacity Step			%	100 – 0	100 – 0	100 – 0
Refrigerant Control				Expansion Valve (Electronic Type)	Capillary Tube	
Ref. Piping	Standard Length		m	5	5	5
	Max. Length		m	50 (Equivalent length 70m)	50 (Equivalent length 70m)	50 (Equivalent length 70m)
	Max. Height Difference		m	30	30	30
Refrigerant	Model			R22	R22	R22
	Charge		kg	3.9 (Charged for 30m)	4.0 (Charged for 5m)	5.5 (Charged for 5m)
Ref. Oil	Model			SUNISO 4GSDID – K	SUNISO 4GSDID – K	SUNISO 4GSDID – K
	Charge		L	1.6	3.0	3.0
Drawing No.				4D031835	4D031836	

Notes: ★1. Nominal capacities are based on the following conditions.

	Cooling	Heating	Piping Length	Hz-Volts	Standard
(1)	Indoor: 27°C(81°F)DB, 19.5°C(67°F)WB; Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 21°C(70°F)DB; Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	5m (Horizontal)	50Hz-380V	—
(2)	Indoor: 27°C(81°F)DB, 19.0°C(66°F)WB; Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 20°C(68°F)DB; Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	5m (Horizontal)	50Hz-380V	—
(3)	Indoor: 27°C(81°F)DB, 19.0°C(66°F)WB; Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 21°C(70°F)DB; Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	7.5m (Horizontal)	50Hz-415V	AS 1861

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

★2. Cooling capacities are gross, not including a deduction for cooling for indoor fan motor heat.
★3. Heating capacities are net, including an addition for heating for indoor fan motor heat.
4. In case of drain piping for outdoor unit, drain piping kit (option) is needed. (RY140KUY1)
★5. AFR (Air Flow Rate) and sound pressure level are shown at 380V-415V.

Models					
Models	Indoor Units			FDY15KAY1	FDY20KAY1
	Outdoor Units			RY200KUY1×2 Units	RY250KUY1×2 Units
★1, ★2 Cooling Capacity (1)/(2)/(3)			kW	44.0/43.5/43.5	53.9/53.0/53.0
			Btu/h	150,000/148,000/148,000	184,000/181,000/181,000
			kcal/h	37,800/37,400/37,400	46,400/45,600/45,600
★1, ★3 Heating Capacity (1)/(2)/(3)			kW	44.6/44.8/44.6	56.6/56.8/56.6
			Btu/h	152,000/153,000/152,000	193,000/194,000/193,000
			kcal/h	38,400/38,500/38,400	48,700/48,800/48,700
Indoor Units				**FDY15KAY1**	**FDY20KAY1**
Dimensions		H×W×D	mm	625×1,620×850 (Without Control Box)	625×1,980×850 (Without Control Box)
Coil	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch			3×26×2.0	3×26×2.0
	Face Area		m²	0.784	0.990
Fan	Type			Sirocco Fan	Sirocco Fan
	Drive			Belt Drive	Belt Drive
	Motor Output		kW	2.2	3.7
	Air Flow Rate ★5		m³/min	136-136	166-166
External Static Pressure			Pa	147	147
Sound Pressure Level ★5			dB (A)	58-58	60-60
Machine Weight			kg	161	187
Piping Connections		Liquid	mm	ϕ12.7 (Brazing)	ϕ15.9 (Brazing)
		Gas	mm	ϕ25.4 (Brazing)	ϕ28.6 (Brazing)
		Drain	in.	PT1 (Internal Thread)	PT1 (Internal Thread)
Remote Controller (Option)		Wired		BRC1C61	BRC1C61
		Wireless		BRC4C62	BRC4C62
Outdoor Units				**RY200KUY1×2 Units**	**RY250KUY1×2 Units**
Color				Ivory	Ivory
Dimensions ★4		H×W×D	mm	1,220×1,280×690	1,440×1,280×690
Coil ★4	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch			2×40×2.0	2×50×2.0
	Face Area		m²	1.57	1.97
Comp. ★4	Model			JT236D-P1YE	JT335D-P1YE
	Type			Hermetically Sealed Scroll Type	
	Motor Output		kW	5.5	9.0
Fan ★4	Model			P52H11SM	P52H11SM
	Type			Propeller	Propeller
	Motor Output		W	230+190	230+190
	Air Flow Rate (C/H) ★5		m³/min	150/138-154/142	175/161-179/165
Machine Weight ★4			kg	180	206
Piping Connections ★4		Liquid	mm	ϕ12.7 (Flare)	ϕ15.9 (Flare)
		Gas	mm	ϕ25.4 (Flange)	ϕ28.6 (Flange)
		Drain	mm	—	—
Safety Devices				Thermal protector for compressor and outdoor fan motor. High pressure switch. Low pressure switch. Reverse phase protector. Over current relay (compressor and indoor fan motor). Fuse.	
Capacity Step			%	100 – 50 – 0	100 – 50 – 0
Refrigerant Control				Capillary Tube	
Ref. Piping	Standard Length		m	5	5
	Max. Length		m	50 (Equivalent length 70m)	50 (Equivalent length 70m)
	Max. Height Difference		m	30	30
Refrigerant	Model			R22	R22
	Charge		kg	4.0 (Charged for 5m) × 2 Units	5.5 (Charged for 5m) × 2 Units
Ref. Oil	Model			SUNISO 4GSDID – K	SUNISO 4GSDID – K
	Charge		L	3.0 × 2 Units	3.0 × 2 Units
Drawing No.				4D031838	

Notes:

★1. Nominal capacities are based on the following conditions.

	Cooling	Heating	Piping Length	Hz-Volts	Standard
(1)	Indoor: 27°C(81°F)DB, 19.5°C(67°F)WB Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 21°C(70°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	5m (Horizontal)	50Hz-380V	—
(2)	Indoor: 27°C(81°F)DB, 19.0°C(66°F)WB Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 20°C(68°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	5m (Horizontal)	50Hz-380V	—
(3)	Indoor: 27°C(81°F)DB, 19.0°C(66°F)WB Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 21°C(70°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	7.5m (Horizontal)	50Hz-415V	AS 1861

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

★2. Cooling capacities are gross, not including a deduction for cooling for indoor fan motor heat.
★3. Heating capacities are net, including an addition for heating for indoor fan motor heat.
★4. The specification of the outdoor unit shows only one unit.
★5. AFR (Air Flow Rate) and sound pressure level are shown at 380V-415V.

1.4 KA Series 60Hz

Models	Indoor Units	TAL	FDY08KATAL	FDY10KATAL
		YAL	FDY08KAYAL	FDY10KAYAL
	Outdoor Units	TAL	RY200KUTAL	RY250KUTAL
		YAL	RY200KUYAL	RY250KUYAL
★1, ★2 Cooling Capacity (1)/(2)/(3)		kW	22.5/22.2/19.8	27.6/27.1/24.3
		Btu/h	76,800/75,700/67,600	94,200/92,500/82,900
		kcal/h	19,300/19,100/17,000	23,700/23,300/20,900
★1, ★3 Heating Capacity (1)/(2)/(3)		kW	23.1/23.2/22.9	29.4/29.5/29.1
		Btu/h	78,800/79,200/78,100	100,300/100,700/99,300
		kcal/h	19,900/20,000/19,700	25,300/25,400/25,000
Indoor Units		TAL	FDY08KATAL	FDY10KATAL
		YAL	FDY08KAYAL	FDY10KAYAL
Dimensions	H×W×D	mm	500×1,130×850 (Without Control Box)	500×1,330×850 (Without Control Box)
Coil	Type		Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch		3×22×2.0	3×22×2.0
	Face Area	m²	0.443	0.540
Fan	Type		Sirocco Fan	Sirocco Fan
	Drive		Belt Drive	Belt Drive
	Motor Output	kW	1.5	1.5
	Air Flow Rate	m³/min	68	83
External Static Pressure		Pa	118	118
Sound Pressure Level		dB (A)	51	53
Machine Weight		kg	94	105
Piping Connections	Liquid	mm	ϕ12.7 (Brazing)	ϕ15.9 (Brazing)
	Gas	mm	ϕ25.4 (Brazing)	ϕ28.6 (Brazing)
	Drain	in.	PT3/4 (Internal Thread)	PT3/4 (Internal Thread)
Remote Controller (Option)	Wired		BRC1C61	BRC1C61
	Wireless		BRC4C62	BRC4C62
Outdoor Units		TAL	RY200KUTAL	RY250KUTAL
		YAL	RY200KUYAL	RY250KUYAL
Color			Ivory	Ivory
Dimensions	H×W×D	mm	1,220×1,280×690	1,440×1,280×690
Coil	Type		Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch		2×40×2.0	2×50×2.0
	Face Area	m²	1.57	1.97
Comp.	Model	TAL	JT212D-P1	JT300D-P1
		YAL	JT212D-P1YH	JT300D-P1YH
	Type		Hermetically Sealed Scroll Type	
	Motor Output	kW	5.5	7.5
Fan	Model		P52H11SM	P52H11SM
	Type		Propeller	Propeller
	Motor Output	W	230+190	230+190
	Air Flow Rate (C/H)	m³/min	160/147	190/175
Machine Weight		kg	179	204
Piping Connections	Liquid	mm	ϕ12.7 (Flare)	ϕ15.9 (Flare)
	Gas	mm	ϕ25.4 (Flange)	ϕ28.6 (Flange)
	Drain	mm	—	—
Safety Devices			Thermal protector for compressor and outdoor fan motor. High pressure switch. Low pressure switch. Reverse phase protector. Over current relay (compressor and indoor fan motor). Fuse	
Capacity Step		%	100 – 0	100 – 0
Refrigerant Control			Capillary Tube	
Ref. Piping	Standard Length	m	5	5
	Max. Length	m	50 (Equivalent length 70m)	50 (Equivalent length 70m)
	Max. Height Difference	m	30	30
Refrigerant	Model		R22	R22
	Charge	kg	4.0 (Charged for 5m)	5.5 (Charged for 5m)
Ref. Oil	Model		SUNISO 4GSDID – K	SUNISO 4GSDID – K
	Charge	L	3.0	3.0
Drawing No.			4D031837	

Notes: ★1. Nominal capacities are based on the following conditions.

	Cooling	Heating	Piping Length	Hz-Volts	Standard
(1)	Indoor: 27°C(81°F)DB, 19.5°C(67°F)WB Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 21°C(70°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	5m (Horizontal)	60Hz-220V 60Hz-380V	—
(2)	Indoor: 27°C(81°F)DB, 19.0°C(66°F)WB Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Indoor: 20°C(68°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	5m (Horizontal)	60Hz-220V 60Hz-380V	—
(3)	Indoor: 29°C(84°F)DB, 19.0°C(66°F)WB Outdoor: 46°C(115°F)DB, 24°C(75°F)WB	Indoor: 21°C(70°F)DB Outdoor: 7°C(45°F)DB, 6°C(43°F)WB	7.5m (Horizontal)	60Hz-220V 60Hz-380V	SSA 385/ 386

Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

★2. Cooling capacities are gross, not including a deduction for cooling for indoor fan motor heat.
★3. Heating capacities are net, including an addition for heating for indoor fan motor heat.

Models	**Indoor Units**		**TAL**	**FDY15KATAL**	**FDY20KATAL**
			YAL	**FDY15KAYAL**	**FDY20KAYAL**
	Outdoor Units		**TAL**	**RY200KUTAL×2 Units**	**RY250KUTAL×2 Units**
			YAL	**RY200KUYAL×2 Units**	**RY250KUYAL×2 Units**
★1, ★2 Cooling Capacity (1)/(2)/(3)			kW	44.0/43.5/38.7	53.9/53.0/47.3
			Btu/h	150,000/148,000/132,000	184,000/181,000/161,000
			kcal/h	37,800/37,400/33,300	46,400/45,600/40,700
★1, ★3 Heating Capacity (1)/(2)/(3)			kW	44.6/44.8/44.6	56.6/56.8/56.6
			Btu/h	152,000/153,000/152,000	193,000/194,000/193,000
			kcal/h	38,400/38,500/38,400	48,700/48,800/48,700
Indoor Units			**TAL**	**FDY15KATAL**	**FDY20KATAL**
			YAL	**FDY15KAYAL**	**FDY20KAYAL**
Dimensions		H×W×D	mm	625×1,620×850 (Without Control Box)	625×1,980×850 (Without Control Box)
Coil	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch			3×26×2.0	3×26×2.0
	Face Area		m²	0.784	0.990
Fan	Type			Sirocco Fan	Sirocco Fan
	Drive			Belt Drive	Belt Drive
	Motor Output		kW	2.2	3.7
	Air Flow Rate		m³/min	136	166
External Static Pressure			Pa	147	147
Sound Pressure Level			dB (A)	58	60
Machine Weight			kg	161	187
Piping Connections		Liquid	mm	ϕ12.7 (Brazing)	ϕ15.9 (Brazing)
		Gas	mm	ϕ25.4 (Brazing)	ϕ28.6 (Brazing)
		Drain	in.	PT1 (Internal Thread)	PT1 (Internal Thread)
Remote Controller (Option)		Wired		BRC1C61	BRC1C61
		Wireless		BRC4C62	BRC4C62
Outdoor Units			**TAL**	**RY200KUTAL×2 Units**	**RY250KUTAL×2 Units**
			YAL	**RY200KUYAL×2 Units**	**RY250KUYAL×2 Units**
Color				Ivory	Ivory
Dimensions ★4		H×W×D	mm	1,220×1,280×690	1,440×1,280×690
Coil ★4	Type			Cross Fin Coil (Waffle Louver Fins and Hi-XA Tubes)	
	Row×Stages×Fin Pitch			2×40×2.0	2×50×2.0
	Face Area		m²	1.57	1.97
Comp. ★4	Model		TAL	JT212D-P1	JT300D-P1
			YAL	JT212D-P1YH	JT300D-P1YH
	Type			Hermetically Sealed Scroll Type	
	Motor Output		kW	5.5	7.5
Fan ★4	Model			P52H11SM	P52H11SM
	Type			Propeller	Propeller
	Motor Output		W	230+190	230+190
	Air Flow Rate (C/H)		m³/min	160/147	190/175
Machine Weight ★4			kg	179	204
Piping Connections ★4		Liquid	mm	ϕ12.7 (Flare)	ϕ15.9 (Flare)
		Gas	mm	ϕ25.4 (Flange)	ϕ28.6 (Flange)
		Drain	mm	—	—
Safety Devices				Thermal protector for compressor and outdoor fan motor. High pressure switch. Low pressure switch. Reverse phase protector. Over current relay (compressor and indoor fan motor). Fuse	
Capacity Step			%	100 – 50 – 0	100 – 50 – 0
Refrigerant Control				Capillary Tube	
Ref. Piping	Standard Length		m	5	5
	Max. Length		m	50 (Equivalent length 70m)	50 (Equivalent length 70m)
	Max. Height Difference		m	30	30
Refrigerant	Model			R22	R22
	Charge		kg	4.0 (Charged for 5m) × 2 Units	5.5 (Charged for 5m) × 2 Units
Ref. Oil	Model			SUNISO 4GSDID – K	SUNISO 4GSDID – K
	Charge		L	3.0 × 2 Units	3.0 × 2 Units
Drawing No.				4D031839	

Notes:

★1. Nominal capacities are based on the following conditions.

	Cooling	Heating	Piping Length	Hz-Volts	Standard
(1)	Indoor: 27°C(81°F)DB, 19.5°C(67°F)WB	Indoor: 21°C(70°F)DB	5m (Horizontal)	60Hz-220V 60Hz-380V	—
	Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Outdoor: 7°C(45°F)DB, 6°C(43°F)WB			
(2)	Indoor: 27°C(81°F)DB, 19.0°C(66°F)WB	Indoor: 20°C(68°F)DB	5m (Horizontal)	60Hz-220V 60Hz-380V	—
	Outdoor: 35°C(95°F)DB, 24°C(75°F)WB	Outdoor: 7°C(45°F)DB, 6°C(43°F)WB			
(3)	Indoor: 29°C(84°F)DB, 19.0°C(66°F)WB	Indoor: 21°C(70°F)DB	7.5m (Horizontal)	60Hz-220V 60Hz-380V	SSA 385/ 386
	Outdoor: 46°C(115°F)DB, 24°C(75°F)WB	Outdoor: 7°C(45°F)DB, 6°C(43°F)WB			

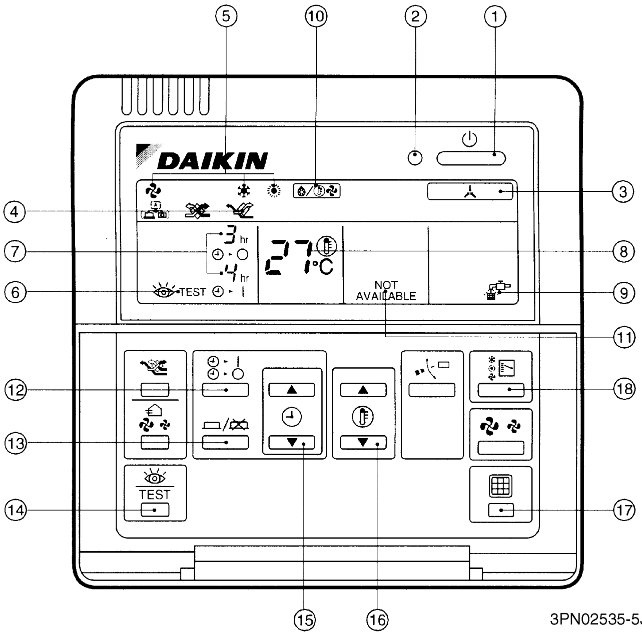
Conversion Formulae
kcal/h=kW×860 Btu/h=kW×3414 cfm=m³/min×35.3

★2. Cooling capacities are gross, not including a deduction for cooling for indoor fan motor heat.
★3. Heating capacities are net, including an addition for heating for indoor fan motor heat.
★4. The specification of the outdoor unit shows only one unit.

Part 4 Remote Controller

1. Remote Controller

1.1 Wired Remote Controller BRC1C51



3PN02535-5J-3

NAME AND FUNCTION OF EACH SWITCH AND DISPLAY ON THE REMOTE CONTROLLER (Fig. 1)

No.	Name	Function
①	ON/OFF BUTTON	Press the button and the system will start. Press the button again and the system will stop.
②	OPERATION LAMP (RED)	The lamp lights up during operation.
③	DISPLAY " " (UNDER CENTRALIZED CONTROL)	When this display shows, the system is UNDER CENTRALIZED CONTROL. (This is not a standard specification.)
④	DISPLAY " " (VENTILATION/AIR CLEANING)	This display shows that the total heat exchange and the air cleaning unit are in operation. (These are optional accessories).
⑤	DISPLAY " " " " " " (OPERATION MODE)	This display shows the current OPERATION MODE.
⑥	DISPLAY " TEST " (INSPECTION/TEST OPERATION)	When the INSPECTION/TEST OPERATION BUTTON is pressed, the display shows the system mode is in.
⑦	DISPLAY " 3hr 4hr " (PROGRAMMED TIME)	This display shows PROGRAMMED TIME of the system start or stop.
⑧	DISPLAY " 27°C " (SET TEMPERATURE)	This display shows the set temperature.
⑨	DISPLAY " " (TIME TO CLEAN AIR FILTER)	Not applied on this model.
⑩	DISPLAY " " (DEFROST)	
⑪	DISPLAY " NOT AVAILABLE "	If indoor unit does not have a function, this display is indicated when pressing buttons for the function.
⑫	TIMER MODE START/STOP BUTTON	
⑬	TIMER ON/OFF BUTTON	
⑭	INSPECTION/TEST OPERATION BUTTON	This button is used only by qualified service persons for maintenance purposes.
⑮	PROGRAMMING TIME BUTTON	Use this button for programming "START and/or STOP" time.
⑯	TEMPERATURE SETTING BUTTON	Use this button for SETTING TEMPERATURE.
⑰	FILTER SIGN RESET BUTTON	Not applied on this model.
⑱	OPERATION MODE SELECTOR BUTTON	Press this button to select OPERATION MODE.

(NOTE)

- For the sake of explanation, all indications are shown on the display in Figure 1 contrary to actual running situations.

3PN02535-5J-6

1.2 Wired Remote Controller BRC1C61

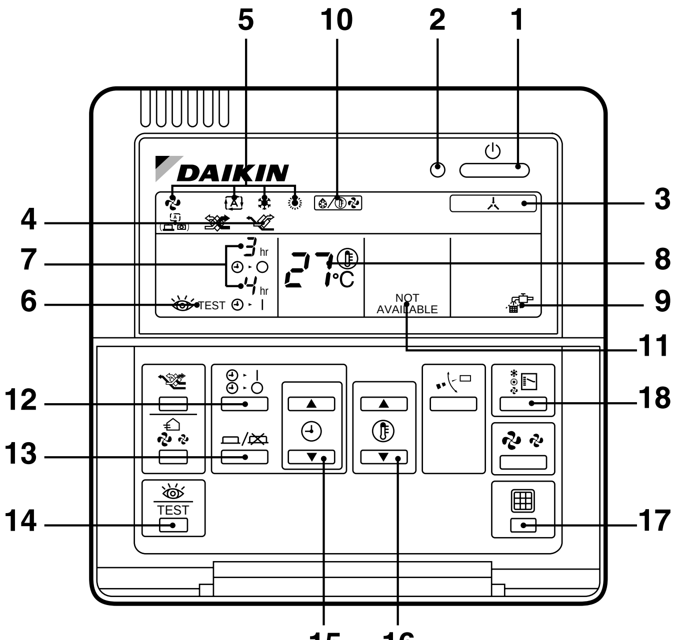


Fig.1

3PN02535-8L-0

NAME AND FUNCTION OF EACH SWITCH AND DISPLAY ON THE REMOTE CONTROLLER

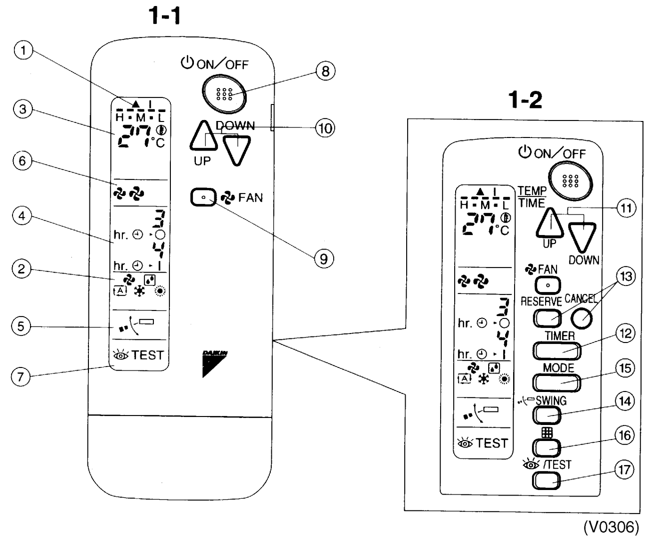
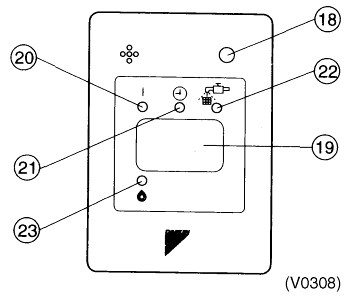
The illustrations in this operating manual correspond to the remote control format BRC1C type.

No.	Name	Function
1	**ON/OFF BUTTON**	Press the button and the system will start. Press the button again and the system will stop.
2	**OPERATION LAMP (RED)**	The lamp lights up during operation.
3	**DISPLAY “ ” (UNDER CENTRALIZED CONTROL)**	When this display shows, the system is UNDER CENTRALIZED CONTROL. (This is not a standard specification.)
4	**DISPLAY “ ” “ ” “ ” (VENTILATION/AIR CLEANING)**	This display shows that the total heat exchange and the air cleaning unit are in operation (These are optional accessories).
5	**DISPLAY “ ” “ ” “ ” “ ” (OPERATION MODE)**	This display shows the current OPERATION MODE.
6	**DISPLAY “ TEST” (INSPECTION/TEST OPERATION)**	When the INSPECTION/TEST OPERATION BUTTON is pressed, the display shows the system mode is in.
7	**DISPLAY “ 3hr 4hr ” (PROGRAMMED TIME)**	This display shows the PROGRAMMED TIME of the system start or stop.
8	**DISPLAY “ 27°C ” (SET TEMPERATURE)**	This display shows the set temperature.
9	**DISPLAY “ ” (TIME TO CLEAN AIR FILTER)**	Not applied on this model.
10	**DISPLAY “ ” (DEFROST)**	
11	**DISPLAY “ NOT AVAILABLE ”**	If indoor unit does not have a function, this display is indicated when pressing buttons for the function.
12	**TIMER MODE START/STOP BUTTON**	
13	**TIMER ON/OFF BUTTON**	
14	**INSPECTION/TEST OPERATION BUTTON**	This button is used only by qualified service persons for maintenance purposes.
15	**PROGRAMMING TIME BUTTON**	Use this button for programming “START and/ or STOP” time.
16	**TEMPERATURE SETTING BUTTON**	Use this button for SETTING TEMPERATURE.
17	**FILTER SIGN RESET BUTTON**	Not applied on this model.
18	**OPERATION MODE SELECTOR BUTTON**	Press this button to select OPERATION MODE.

NOTE
For the sake of explanation, all indications are shown on the display in Figure 1 contrary to actual running situations.

3PN02535-8L-3

1.3 Wireless Remote Controller BRC4C62

Fig.1	Fig.2
	

NAMES AND FUNCTIONS OF THE OPERATING SECTION

No.	Name	Function
①	DISPLAY " ▲ " (SIGNAL TRANSMISSION)	This lights up when a signal is being transmitted.
②	DISPLAY "❀" "[▪]" "[A]" "✻" "☀" (OPERATION MODE)	This display shows the current OPERATION MODE. For straight cooling type, "[A]" (Auto) and "☀" (Heating) are not installed.
③	DISPLAY "27°C" (SET TEMPERATURE)	This display shows the set temperature.
④	DISPLAY "3 4" (PROGRAMMED TIME)	This display shows PROGRAMMED TIME of the system start or stop.
⑤	DISPLAY "⟡" (AIR FLOW FLAP)	
⑥	DISPLAY "❀" "❀" (FAN SPEED)	The display shows the set fan speed.
⑦	DISPLAY "👁/TEST" (INSPECTION/TEST OPERATION)	When the INSPECTION/TEST OPERATION BUTTON is pressed, the display shows the system mode is in.
⑧	ON/OFF BUTTON	Press the button and the system will start. Press the button again and the system will stop.
⑨	FAN SPEED CONTROL BUTTON	Press this button to select the fan speed, HIGH or LOW, of your choice.
⑩	TEMPERATURE SETTING BUTTON	Use this button for SETTING TEMPERATURE (Operates with the front cover of the remote controller closed.)
⑪	PROGRAMMING TIMER BUTTON	Use this button for programming "START and/or STOP" time. (Operates with the front cover of the remote controller opened.)
⑫	TIMER MODE START/STOP BUTTON	
⑬	TIMER RESERVE/CANCEL BUTTON	
⑭	AIR FLOW DIRECTION ADJUST BUTTON	
⑮	OPERATION MODE SELECTOR BUTTON	Press this button to select OPERATION MODE.
⑯	FILTER SIGN RESET BUTTON	Refer to the section of MAINTENANCE in the operation manual attached to the indoor unit.
⑰	INSPECTION/TEST OPERATION BUTTON	This button is used only by qualified service persons for maintenance purposes.
⑱	EMERGENCY OPERATION SWITCH	This switch is readily used if the remote controller does not work.
⑲	RECEIVER	This receives the signals from the remote controller.
⑳	OPERATING INDICATOR LAMP (Red)	This lamp stays lit while the air conditioner runs. It flashes when the unit is in trouble.
㉑	TIMER INDICATOR LAMP (Green)	This lamp stays lit while the timer is set.
㉒	AIR FILTER CLEANING TIME INDICATOR LAMP (Red)	Lights up when it is time to clean the air filter.
㉓	DEFROST LAMP (Orange)	Lights up when the defrosting operation has started.

(NOTE)
- For the sake of explanation, all indications are shown on the display in Figure 1 contrary to actual running situations.
- Fig. 1-2 shows the remote controller with the front cover opened.
- If the air filter cleaning time indicator lamp lights up, clean the air filter as explained in the operation manual provided with the indoor unit. After cleaning and reinstalling the air filter, press the filter sign reset button on the remote controller. The air filter cleaning time indicator lamp on the receiver will go out.

(V0309)

Part 5
Field Piping and Wiring

1. Field Piping and Wiring

1.1 FDY06, 08, 10K(A)

1.1.1 Refrigerant Piping Work

〈 **For refrigerant piping of outdoor units, see the installation manual attached to the outdoor unit.** 〉

〈 Execute heat insulation work completely on both sides of the gas piping and the liquid piping. Otherwise, a water leakage can result sometimes. 〉

⚠ WARNING

Do not mix gas other than the specified refrigerant into the refrigerant cycle.
Ventilate the area should any refrigerant leak during installation.

- Piping should be brazed onto the indoor unit.
  Check the size of the refrigerant piping with the chart below.
- Use seamless copper piping only. (ISO1337)
  (See Fig.8 in reference to "L")

	Refrigerant piping size	
	Gas pipe	Fluid pipe
FDY06 type	ø19.1 × t1.0, L=10	ø9.5 × t0.8, L=7
FDY08 type	ø25.4 × t1.2, L=12	ø12.7 × t0.9, L=8
FDY10 type	ø28.6 × t1.4, L=12	ø15.7 × t1.0, L=8

⚠ WARNING

- **Do not heat the plugs before cutting off their ends in order to release pressure, otherwise the plugs may burst (see Fig.7).**
- **Do not burn the air conditioner body during brazing the pipes.**

- Incase of FDY10K, use gas pipe ⑨ (attached) (see Fig.8-2).
- Remove the cardboard and cut the end of the plugs before heating the pipes to remove the plugs (refer to Fig.7).
- After brazing the pipes as shown in Fig.8, use the fitting insulation to secure the pipe inside of the unit (see Figs.9 and 10).
  Install the clamps as close to the body as possible to absorb leaking condensation.
- Wrap the fitting insulation's joints with tape (commercially available), making sure that there is no gap between the fitting insulation. (see Fig.9-2)
- Avoid the mixture into a refrigerating cycle of any air and whatnot except the designated refrigerant.
- Carry out sufficient ventilation if the refrigerant gas leaks during installation work.
- Insulate connecting piping completely. While heating the highest temperature of gas piping become 120°C.
  Use the insulator that the highest temperature can be resisted.

Fig. 7

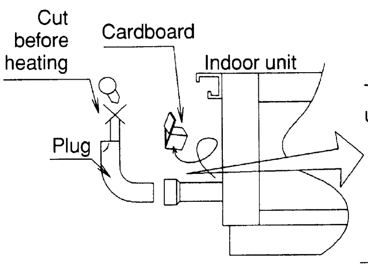


Fig. 8-1

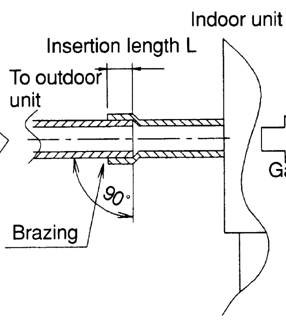


Fig. 9-1

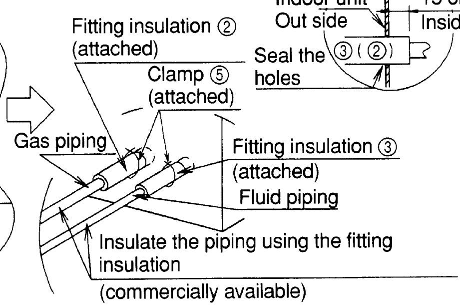


Fig. 10

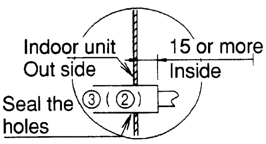


Fig. 8-2

(In case of gas pipe of FDY10K)

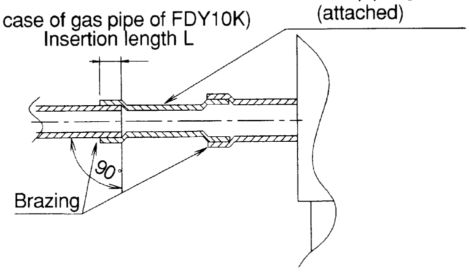
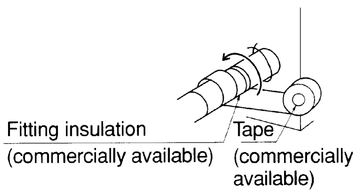


Fig. 9-2



3PN00281-19Q-6

1.1.2 Drain Piping Work

⚠ **WARNING**

The drain pipe must be installed as shown in the diagram below to avoid water damage caused by leaks and condensation.

- Assemble the unit as shown in Fig.11.
- The drain pipe outlet can be installed on either the left or right side. The drain plug can be removed and placed on either the left or right side as well.
- For best results, try to keep the piping as short as possible. Slant the piping at an angle to improve flow (the drain pipe provided with the indoor unit has a PT 3/4 internal thread). See Fig.11.
- Securely insulate the drain pipe.
- It is necessary to provided a drain trap in the drain outlet to relieve negative pressure that exists within the unit compared to the outside atmospheric pressure when the unit is operating. If a drain trap is not provided, splashes or an odor may be produced.
- Keep pipes as straight as possible for easy cleaning and to prevent the accumulation of dirt and debris.
- After closing the drain pipe on the opposite side of the unit, completely wrap the drain pipes with insulation (see Fig.11).
- Pour water in the drain pan to test for smooth drainage.
- In humid environments, use an extra drain pan (commercially available) to cover the entire area of the indoor unit.

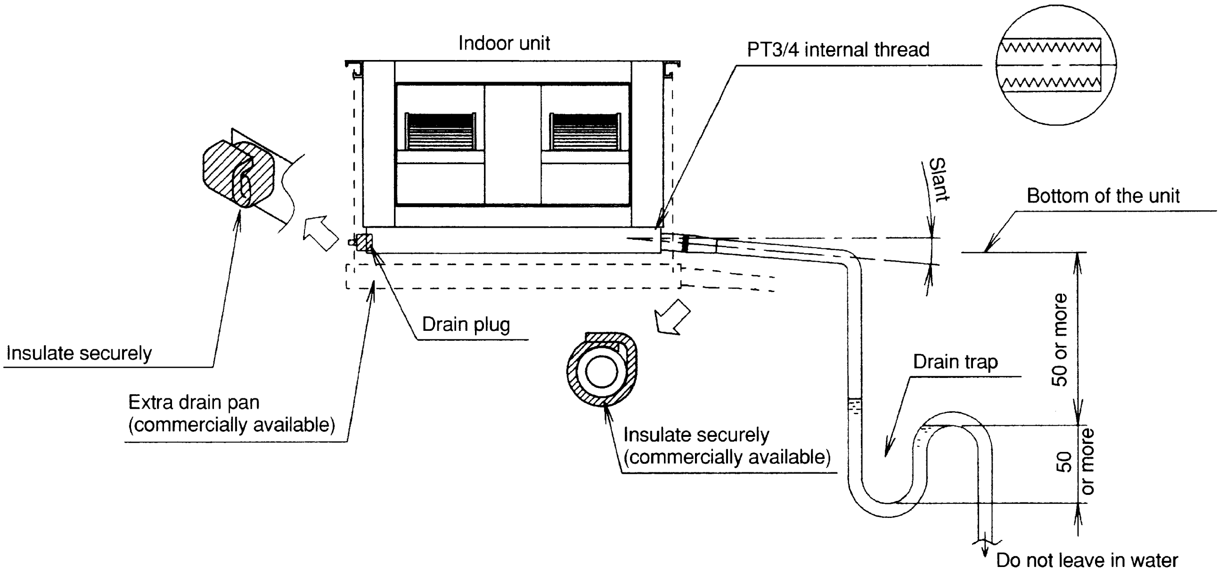


Fig. 11

WHEN ELECTRIC WIRING WORK IS FINISHED

- Check drainage flow during COOL running, explained under the section entitled TEST OPERATION.

3PN00281-19Q-7

1.1.3 Electric Wiring Work

- All field supplied parts and materials and electric works must conform to local codes.
- Use copper wire only.
- For electric wiring work, refer also to "WIRING DIAGRAM" attached to the unit body.
- For remote controller ① (⑦, ⑧) wiring details, refer to the installation manual attached to this indoor unit.
- All wiring must be performed by an authorized electrician.
- A circuit breaker capable of shutting down power supply to the entire system must be installed.
- The resistance of the grounding must not exceed 100Ω.
- Ground the air conditioner.
  Do not connect the earth wire to gas or water pipes, lightning conductor or telephone earth wire.
  Incomplete grounding may cause electric shocks.
  - Gas pipe – Ignition or explosion may occur if the gas leaks.
  - Water pipe – Hard vinyl tubes are not effective grounds.
  - Lightning conductor or telephone ground wire. – Electric potential may rise abnormally if struck by a lightning bolt.
- Refer to Table 2 for specifications of field wire.

Table 2

Model	Power supply			Wire type of wiring between the units.	Unit-Remote controller		
	Field fuse	Wire type	Size		Wire type	Size	Length
FDY06K(A)Y1	15A	H05VV-V4G	Wiring size must comply with the applicable local and national code.	H05VV-U3 2.5	Vinyl cord with sheath or cable (2 wires) (NOTE 2)	0.75-1.25mm²	Max.500 m
FDY08K(A)Y1	15A	H05VV-V4G		H05VV-U3 2.5			
FDY10K(A)Y1	15A	H05VV-V4G		H05VV-U3 2.5			
FDY08K(A)TAL	15A	H05VV-V4G		H05VV-U3 2.5			
FDY10K(A)TAL	15A	H05VV-V4G		H05VV-U3 2.5			
FDY08K(A)YAL	15A	H05VV-V4G		H05VV-U3 2.5			
FDY10K(A)YAL	15A	H05VV-V4G		H05VV-U3 2.5			

NOTE) 1. Shows only in case of protected pipes. Use HO7RN-F in case of no protection or the wire of YZW type in GB5013.2.
2. Shield wire materials may be used for transmission wiring, and they comply with EMI (EN55014). (Refer to NOTE 2 of WIRING EXAMPLE.)

⟨ Methods of wiring units and connecting remote controller cords ⟩ (Refer to Fig. 12)

- **All wires must be wired through bushes at the bottom of control box.**
- **Detach the control box from the side of the unit.**
- **Attach support plates ④ onto the air inlet side of the unit.**
- **Install the control box onto the support plates.**
- **Remove the control box lid indicated in the figure.**
- **Motor wiring.**
  Connect connector of motor wiring from the unit to that of wiring from magnetic relay (KIM) inside the control box. In doing this, fully secure the cords using clamp.
- **Power supply wiring and earth wiring.**
  Connect power supply wiring to the power supply terminal board (X3M) inside the control box and connect earth wiring to the earth terminal ⏚ inside the control box. In doing this, fully secure the cords using clamp.
- **Wiring from outdoor unit.**
  Connect wiring from outdoor unit to the terminal board (X2M) inside the control box. In doing this, fully secure the cords using clamp.
- **Thermistor cords.**
  Connect thermistor cords to the connector of X18A or X19A on the printed circuit board (A1P) inside the control box. In doing this, connect smaller connector to X18A and larger connector to X19A. After doing this, fully secure the cords using clamp.
- **Remote controller cords.**
  Connect the cords to the remote controller terminal board (X1M), no polarity, inside the control box. In doing this, fully secure the cords using clamp.
- **Earth wiring from the unit to control box.**
  Connect earth wiring from the earth terminal of the unit to that of control box. In doing this, fully secure the cords using clamp.

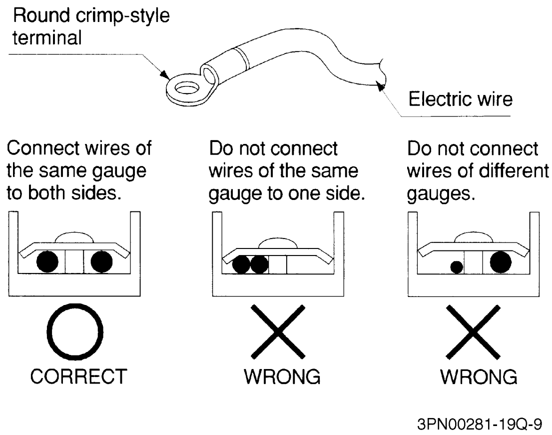
3PN00281-19Q-8

〈 PRECAUTIONS 〉

- Do not contact wires with gas or liquid piping.
  Be sure to insulate piping completely. (Refer to Fig 9-2)
- Check that the wires are not trapped in the control box lid or service cover.
- Do not clamp remote controller cords together with wires connecting the units together. Doing so may cause malfunction.
- Remote controller cords and wires connecting the units should be located at least 50 mm from other electric wires. Not following this guideline may result in malfunction due to electrical noise.

Observe the notes mentioned below when wiring to the power supply terminal board. Precautions to be taken for power supply wiring.
(Use a round crimp-style terminal for connection to the power supply terminal board. In case it cannot be used due to unavoidable reasons, be sure to observe the following instructions.)

- Do not connect wires of different gauge to the same power supply terminal.
  (Looseness in the connection may cause overheating.)
- When connecting wires of the same gauge, connect them according to the figure on right.
- In wiring, make certain that prescribed wires are used, carry out complete connections, and fix the wires so that outside forces are not applied to the terminals.



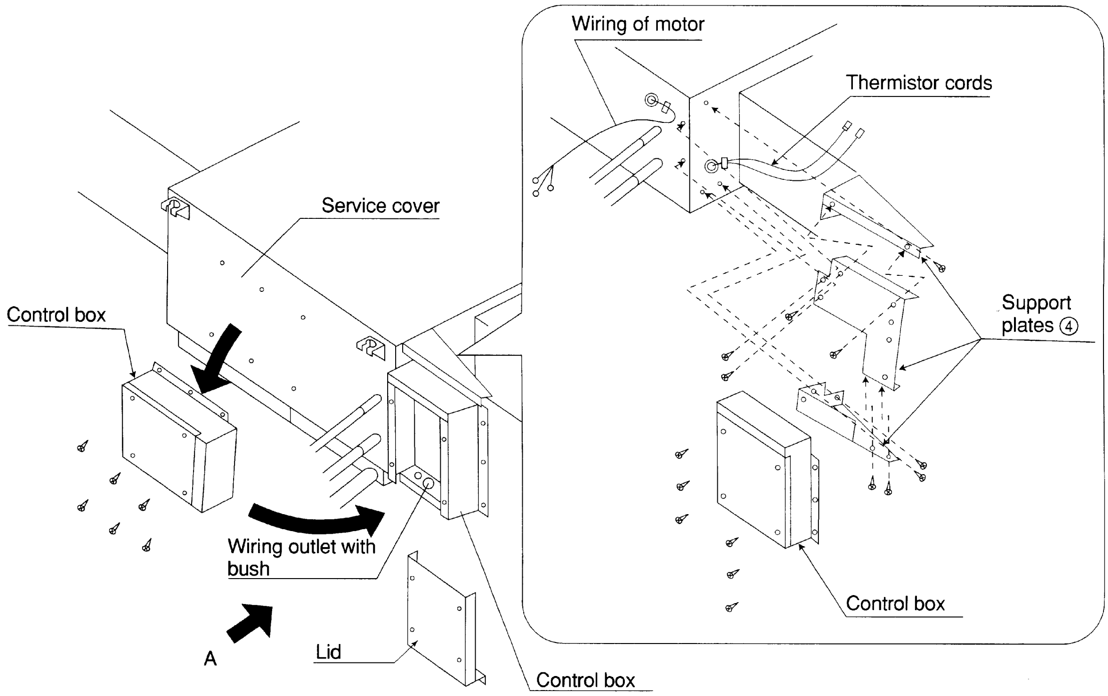
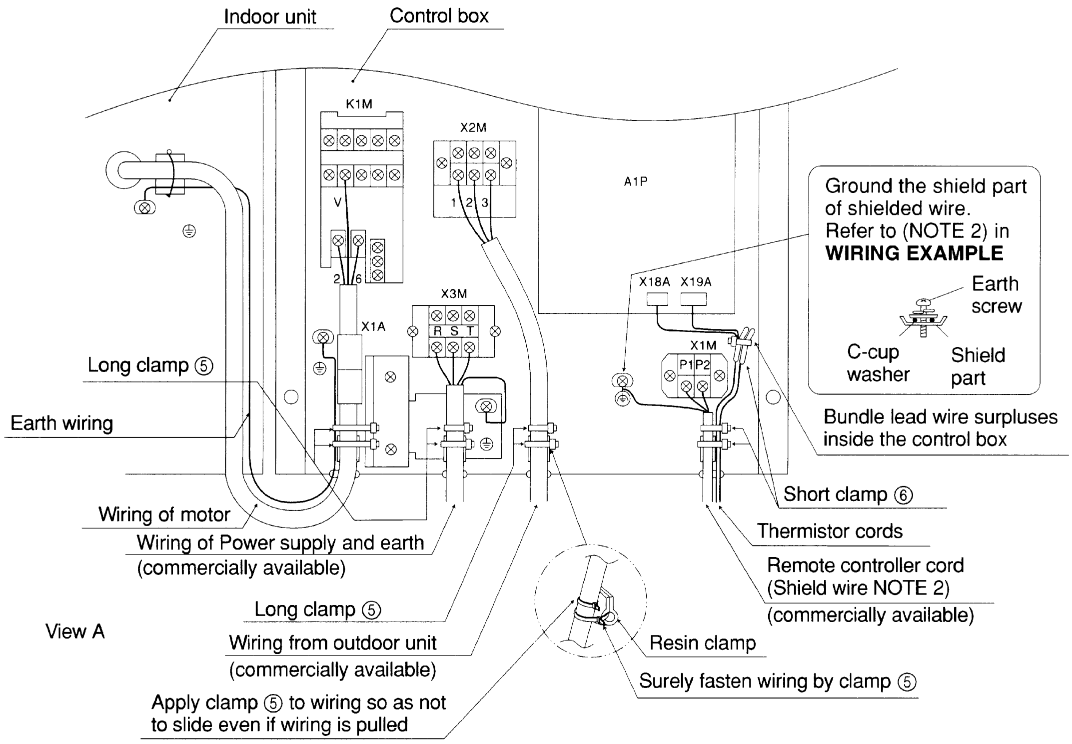


Fig. 12



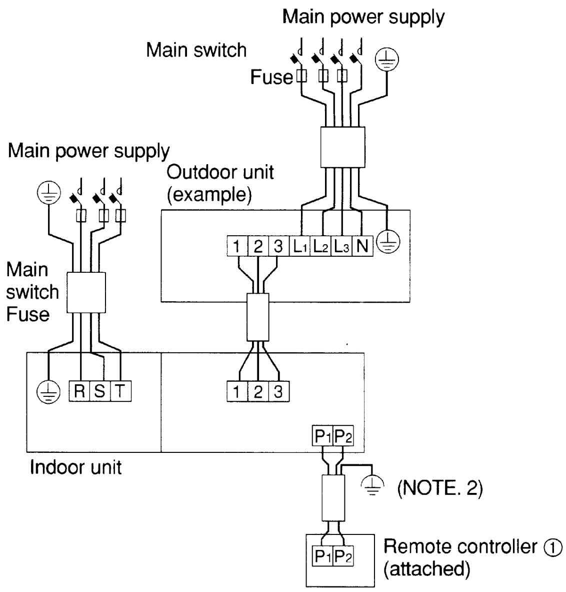
3PN00281-19Q-10

1.1.4 Wiring Example

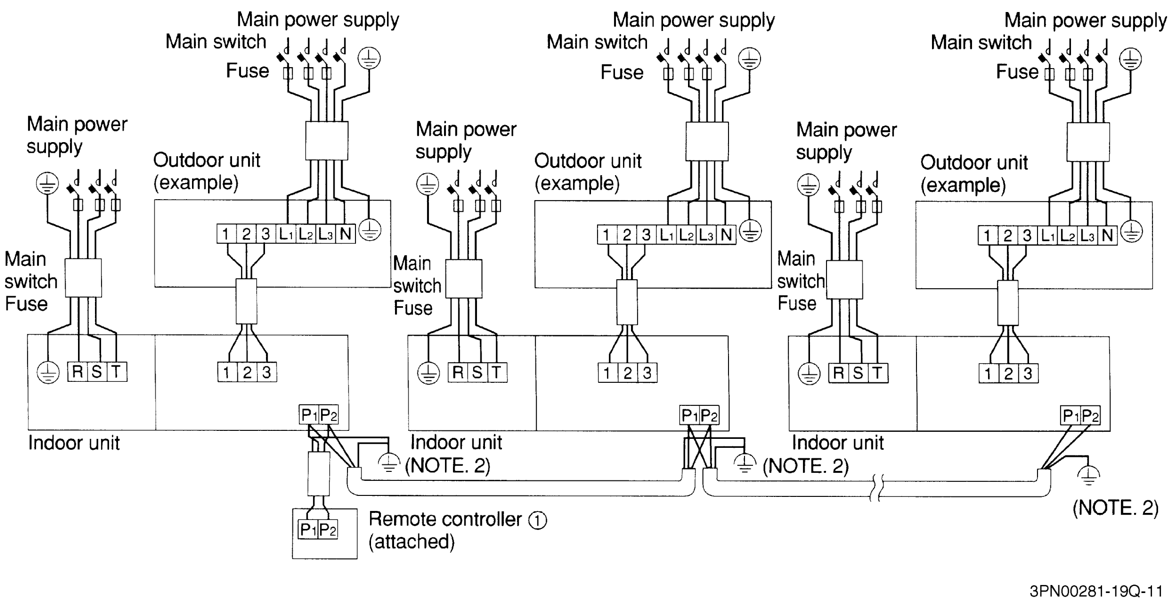
(For the wiring of outdoor units, refer to the installation manual attached to the outdoor unit.)
Confirm the system type.

- Pair type: 1 remote controller controls 1 indoor unit (standard system).
- Group control: 1 remote controller controls up to 16 indoor units (All indoor units operate according to the remote controller).
- 2 remote controller control: 2 remote controller control 1 indoor unit.

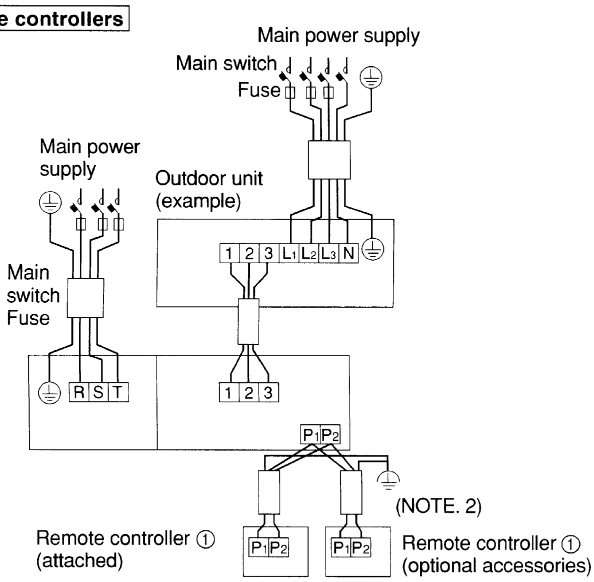
Pair type



Group control



Control by 2 remote controllers



NOTE)
1. All transmission wiring except for the remote controller wires must match the terminal symbol.
2. If using shield wire for transmission wiring, ground the shield of the shield wire to "⏚", at the grounding screw of the remote controller cord grounding terminal inside the control box. (Refer to Fig. 12)
3. For group control remote controller, choose the remote controller that suits the indoor unit which has the most functions (as attached swing flap).

3PN00281-19Q-12

1.1.5 Test Operation

⟨⟨ Refer to the section of "FOR THE FOLLOWING ITEMS, TAKE SPECIAL CARE DURING CONSTRUCTION AND CHECK AFTER INSTALLATION IS FINISHED". ⟩⟩

(1) Check the tension of the fan belt before test operation.
Proper tension of the fan belt is approx. 4mm of relaxation when it is pressed lightly by finger.

(2) Open the gas side stop valve.

(3) Open the liquid side stop valve.

(4) Electrify crank case heater for 6 hours.

(5) Set to cooling operation with the remote controller and start operation by pushing ON/OFF button. (⏻)

(6) Press Inspection/Test Operation button 4 times (TEST) and operate at Test Operation mode for 3 minutes.

(7) Press Inspection/Test Operation button (TEST) and operate normally.

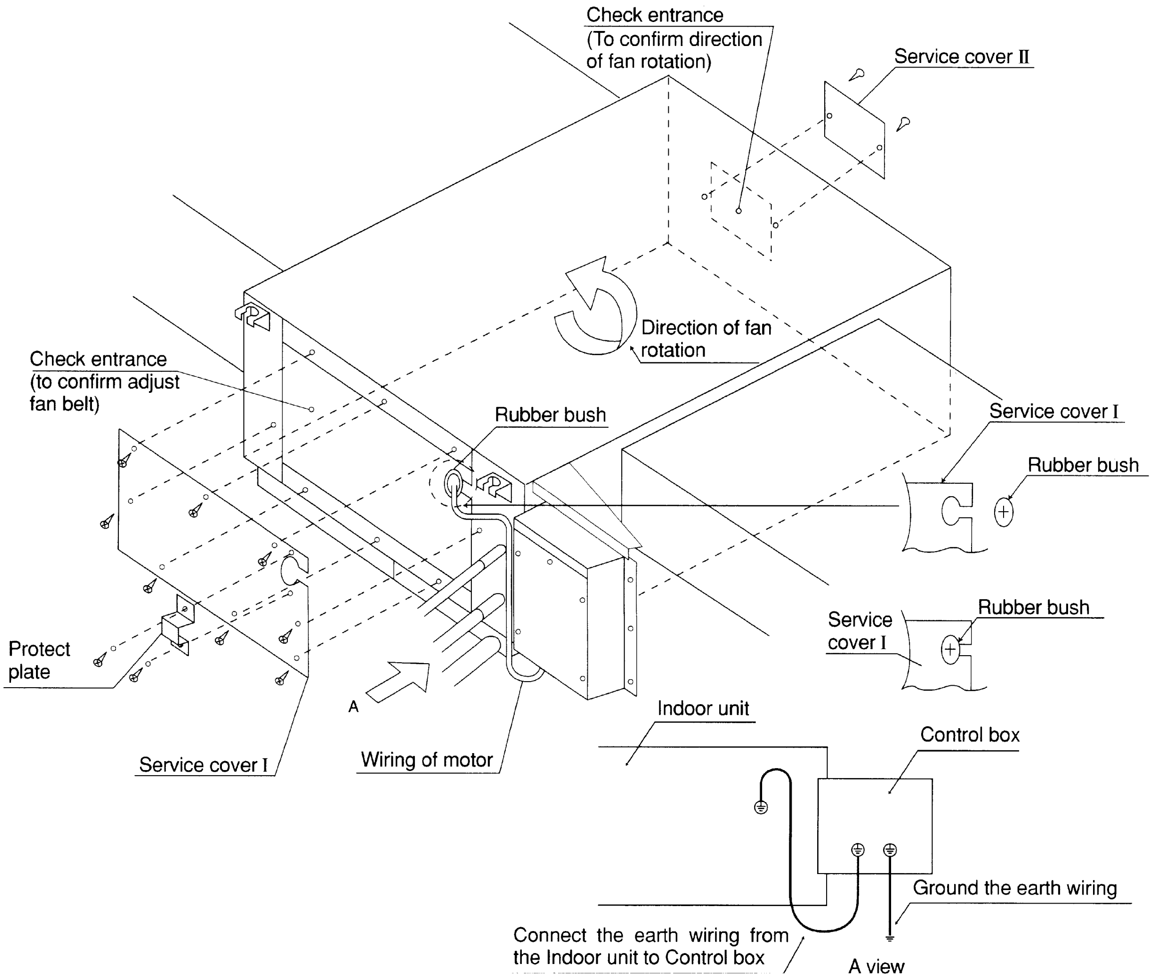
(8) Confirm function of unit according to the operation manual.

(9) Confirm the direction of fan rotation.

(10) Install rubber bush in the part of penetration through the wiring of motor surely when you detach the service cover I.

(11) Check the earth wiring was connected.

⟨ **PRECAUTIONS** ⟩ 1. In case something is wrong with the unit and it does not operate, refer to the malfunction diagnosis label attached to the unit.



3PN00281-19Q-14

1.2 FDY15 / 20K(A)

1.2.1 Refrigerant Piping Work

〈 **For refrigerant piping of outdoor units, see the installation manual attached to the outdoor unit.** 〉

〈 Execute heat insulation work completely on both sides of the gas piping and the liquid piping. Otherwise, a water leakage can result sometimes. 〉

⚠ WARNING

Do not mix gas other than the specified refrigerant into the refrigerant cycle.
Ventilate the area should any refrigerant leak during installation.

- Piping should be brazed onto the indoor unit.
  Check the size of the refrigerant piping with the chart below.
- Use seamless copper piping only. (ISO1337)

	Refrigerant piping size	
	Gas pipe	Liquid pipe
FDY15 type	(ø25.4, L=12) × 2	(ø12.7, L=8) × 2
FDY20 type	(ø28.6, L=12) × 2	(ø15.9, L=8) × 2

(See Fig.10 in reference to "L")

⚠ WARNING

- **Do not heat the plugs before cutting off their ends in order to release pressure, otherwise the plugs may burst.**
- **Do not burn the air conditioner body during brazing the pipes.**

3PN00281-22S-7

- Incase of FDY20K, use gas pipe ⑨ (attached) (see Fig.10-2).
- Remove the cardboard and cut the end of the plugs before heating the pipes to remove the plugs (refer to Fig.9).
- After brazing the pipes as shown in Fig.10, use the fitting insulation to secure the pipe inside of the unit (see Figs.11 and 12).
  Install the clamps as close to the body as possible to absorb leaking condensation.
- Wrap the fitting insulation's joints with tape (commercially available), making sure that there is no gap between the fitting insulation. (see Fig.11-2)
- Avoid the mixture into a refrigerating cycle of any air and whatnot except the designated refrigerant.
- Carry out sufficient ventilation if the refrigerant gas leaks during installation work.
- Insulate connecting piping completely. While heating the highest temperature of gas piping become 120°C.
  Use the insulator that the highest temperature can be resisted.

Fig. 9

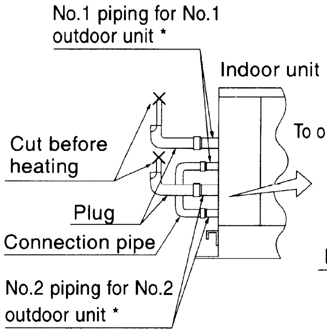


Fig. 10-1

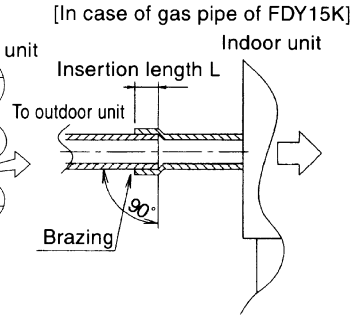
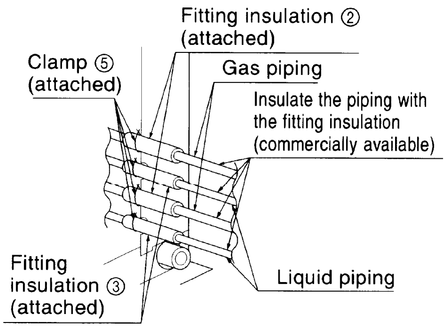


Fig. 11-1



* Piping and wiring must be connected to the same No. of outdoor unit.

Set-up the connection piping without obstructing the drain piping.

Fig. 10-2

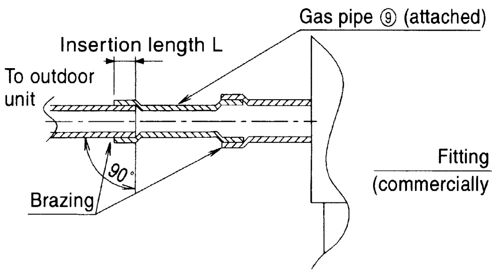


Fig. 11-2

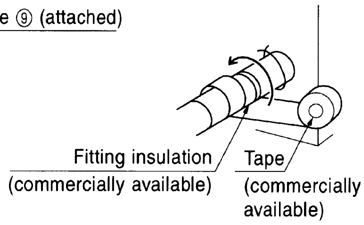
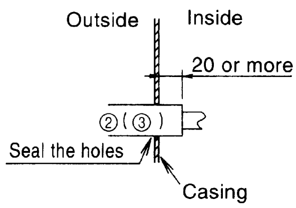
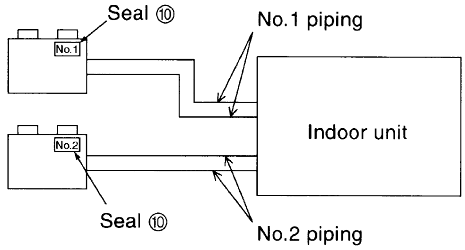


Fig. 12



- Affix the seal ⑩ marked "No.1" on the outdoor unit whose piping is connected to the piping of the No.1 side of the indoor unit.
  Affix the seal ⑩ marked "No.2" on the outdoor unit whose piping is connected to the piping of the No.2 side of the indoor unit.



3PN00281-22S-8

1.2.2 Drain Piping Work

⚠ **WARNING**

The drain pipe must be installed as shown in the diagram below to avoid water damage caused by leaks and condensation.

- Assemble the unit as shown in Fig.13.
- The drain pipe outlet can be installed on either the left or right side. The drain plug can be removed and placed on either the left or right side as well.
- For best results, try to keep the piping as short as possible. Slant the piping at an angle to improve flow (the drain pipe provided with the indoor unit has a PS 1B internal thread). See Fig.13.
- Securely insulate the drain pipe.
- It is necessary to provided a drain trap in the drain outlet to relieve negative pressure that exists within the unit compared to the outside atmospheric pressure when the unit is operating. If a drain trap is not provided, splashes or an odor may be produced.
- Keep pipes as straight as possible for easy cleaning and to prevent the accumulation of dirt and debris.
- After closing the drain pipe on the opposite side of the unit, completely wrap the drain pipes with insulation (see Fig.13).
- Pour water in the drain pan to test for smooth drainage.
- In humid environments, use an extra drain pan (commercially available) to cover the entire area of the indoor unit.

Drain piping connection
PS 1B internal thread + PT 1B external thread
(Indoor unit) (commercially available)

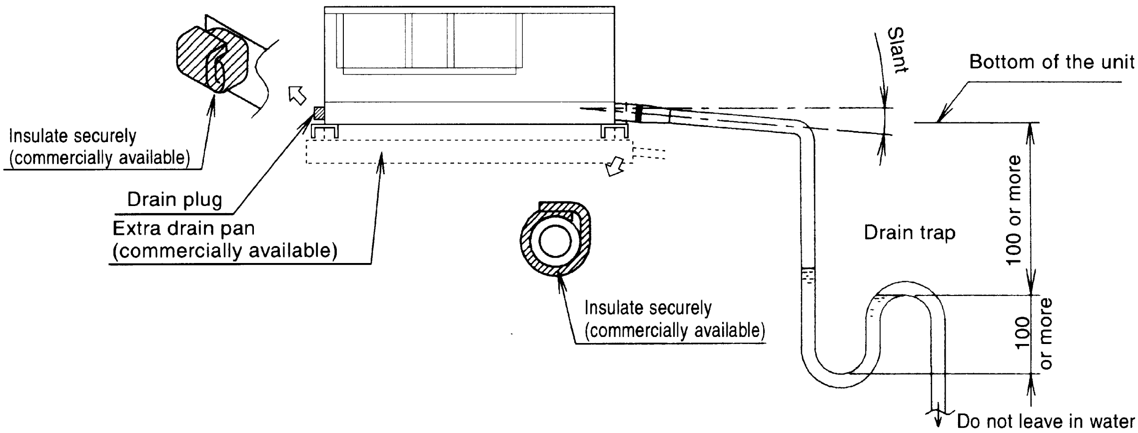


Fig. 13

WHEN ELECTRIC WIRING WORK IS FINISHED

- Check drainage flow during COOL running, explained under the section entitled TEST OPERATION.

3PN00281-22S-9

1.2.3 Electric Wiring Work

- All field supplied parts and materials and electric works must conform to local codes.
- Use copper wire only.
- For electric wiring work, refer also to "WIRING DIAGRAM" attached to the unit body.
- For remote controller ① (⑦, ⑧) wiring details, refer to the installation manual attached to this indoor unit.
- All wiring must be performed by an authorized electrician.
- A circuit breaker capable of shutting down power supply to the entire system must be installed.
- The resistance of the grounding must not exceed 100Ω.
- Ground the air conditioner.
  Do not connect the earth wire to gas or water pipes, lightning conductor or telephone earth wire. Incomplete grounding may cause electric shocks.
  - Gas pipe – Ignition or explosion may occur if the gas leaks.
  - Water pipe – Hard vinyl tubes are not effective grounds.
  - Lightning conductor or telephone ground wire. – Electric potential may rise abnormally if struck by a lightning bolt.
- Refer to Table 2 for specifications of field wire.

Table 2

Model	Power supply			Wire type of wiring between the units.	Unit-Remote controller		
	Field fuse	Wire type	Size		Wire type	Size	Length
FDY15K(A)Y1	15A	H05VV-V4G	Wiring size must comply with the applicable local and national code.	H05VV-U3 2.5	Vinyl cord with sheath or cable (2 wires) (NOTE 2)	0.75-1.25 mm^2	Max.500 m
FDY20K(A)Y1	30A	H05VV-V4G		H05VV-U3 2.5			
FDY15K(A)TAL	30A	H05VV-V4G		H05VV-U3 2.5			
FDY20K(A)TAL	50A	H05VV-V4G		H05VV-U3 2.5			
FDY15K(A)TAL	15A	H05VV-V4G		H05VV-U3 2.5			
FDY20K(A)TAL	30A	H05VV-V4G		H05VV-U3 2.5			

NOTE) 1. Shows only in case of protected pipes. Use HO7RN-F in case of no protection or the wire of YZW type in GB5013.2.
2. Shield wire materials may be used for transmission wiring, and they comply with EMI (EN55014). (Refer to NOTE 2 of WIRING EXAMPLE.)
3. Instead of fuse, use circuit breaker.

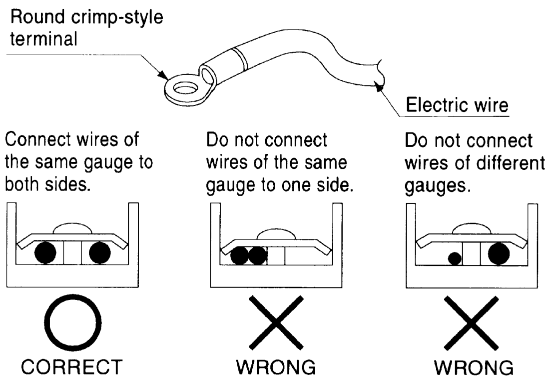
〈 Methods of wiring units and connecting remote controller cords 〉 (Refer to Fig. 14, 15)

- **All wires must be wired through bushes at the bottom of control box.**
- **Detach the control box from the side of the unit.**
- **Attach support plates ④ onto the air outlet side of the unit.**
- **Install the control box onto the support plates.**
- **Remove the control box lid indicated in the figure.**
- **Motor wiring.**
  Connect connector of motor wiring from the unit to that of wiring from magnetic relay (KIM) inside the control box. In doing this, fully secure the cords using clamp.
- **Power supply wiring and earth wiring.**
  Connect power supply wiring to the power supply terminal board (X3M) inside the control box and connect earth wiring to the earth terminal ⏚ inside the control box. In doing this, fully secure the cords using clamp.
- **Wiring from outdoor unit.**
  Connect wiring from outdoor unit to the terminal board (X2M) inside the control box. Connect the wiring from the No.1 outdoor unit to terminals No. 11, 12, and 13 of the indoor unit terminal block X2M. Connect the wiring from the No.2 outdoor unit to terminals No. 21, 22 and 23 of the indoor unit terminal block X2M. In doing this, fully secure the cords using clamp.

3PN00281-22S-10

- **Thermistor cords.**
  Connect thermistor cords to the connector of X18A or X19A on the printed circuit board (A101P or A102P) inside the control box. At this time, connect the thermistor cord marked “No.1” to the X18A connector of the A101P circuit board marked “No.1”. Also, connect the thermistor cord marked “No.2” to the X18A connector of the A102P circuit board marked “No.2”.
  Thermistor cords connected to X19A may be connected to either A101P or A102P. (They can be reversed.)
  After doing this, fully secure the cords using clamp.
- **Remote controller cords.**
  Connect the cords to the remote controller terminal board (X1M), no polarity, inside the control box. In doing this, fully secure the cords using clamp.
- **Earth wiring from the unit to control box.**
  Connect earth wiring from the earth terminal of the unit to that of control box.In doing this, fully secure the cords using clamp.

〈 PRECAUTIONS 〉
- Do not contact wires with gas or liquid piping.
  Be sure to insulate piping completely. (Refer to Fig 11-2)
- Check that the wires are not trapped in the control box lid or service cover.
- Do not clamp remote controller cords together with wires connecting the units together. Doing so may cause malfunction.
- Remote controller cords and wires connecting the units should be located at least 50 mm from other electric wires. Not following this guideline may result in malfunction due to electrical noise.
  Observe the notes mentioned below when wiring to the power supply terminal board. Precautions to be taken for power supply wiring.
  (Use a round crimp-style terminal for connection to the power supply terminal board. In case it cannot be used due to unavoidable reasons, be sure to observe the following instructions.)
- Do not connect wires of different gauge to the same power supply terminal.
  (Looseness in the connection may cause overheating.)
- When connecting wires of the same gauge, connect them according to the figure on right.
- In wiring, make certain that prescribed wires are used, carry out complete connections, and fix the wires so that outside forces are not applied to the terminals.



3PN00281-22S-11

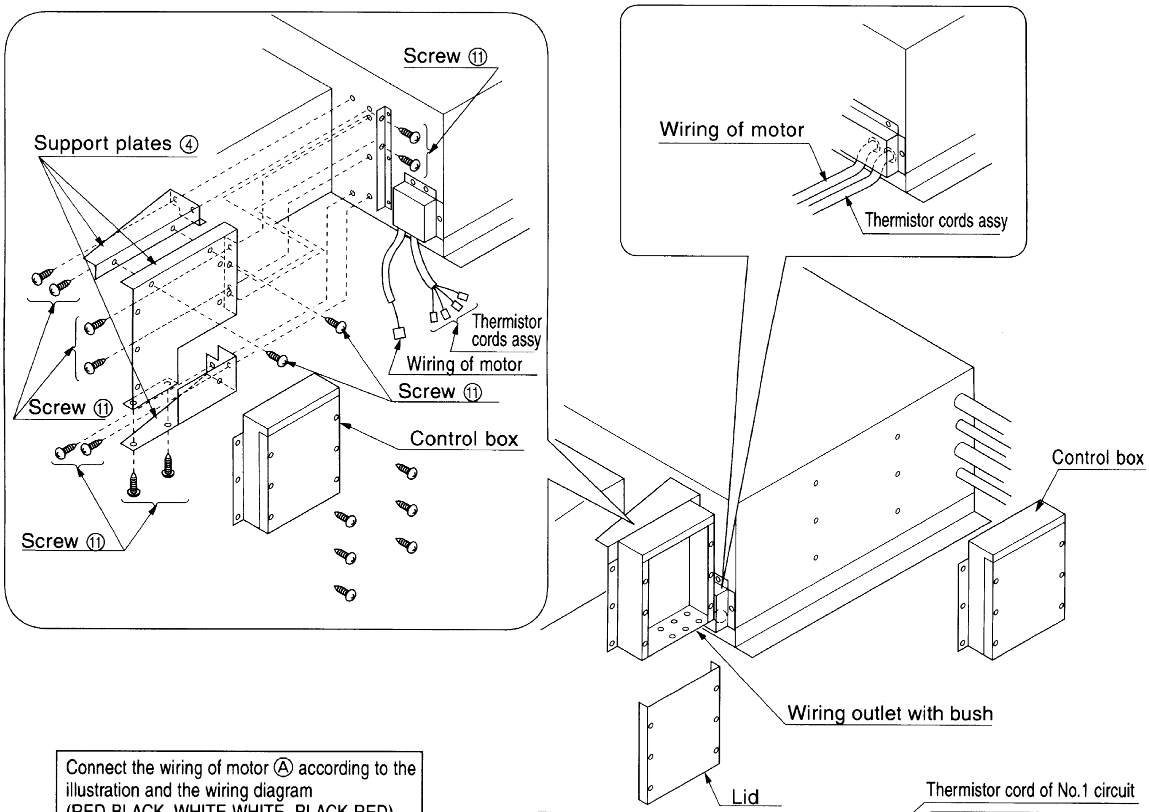


Fig. 14

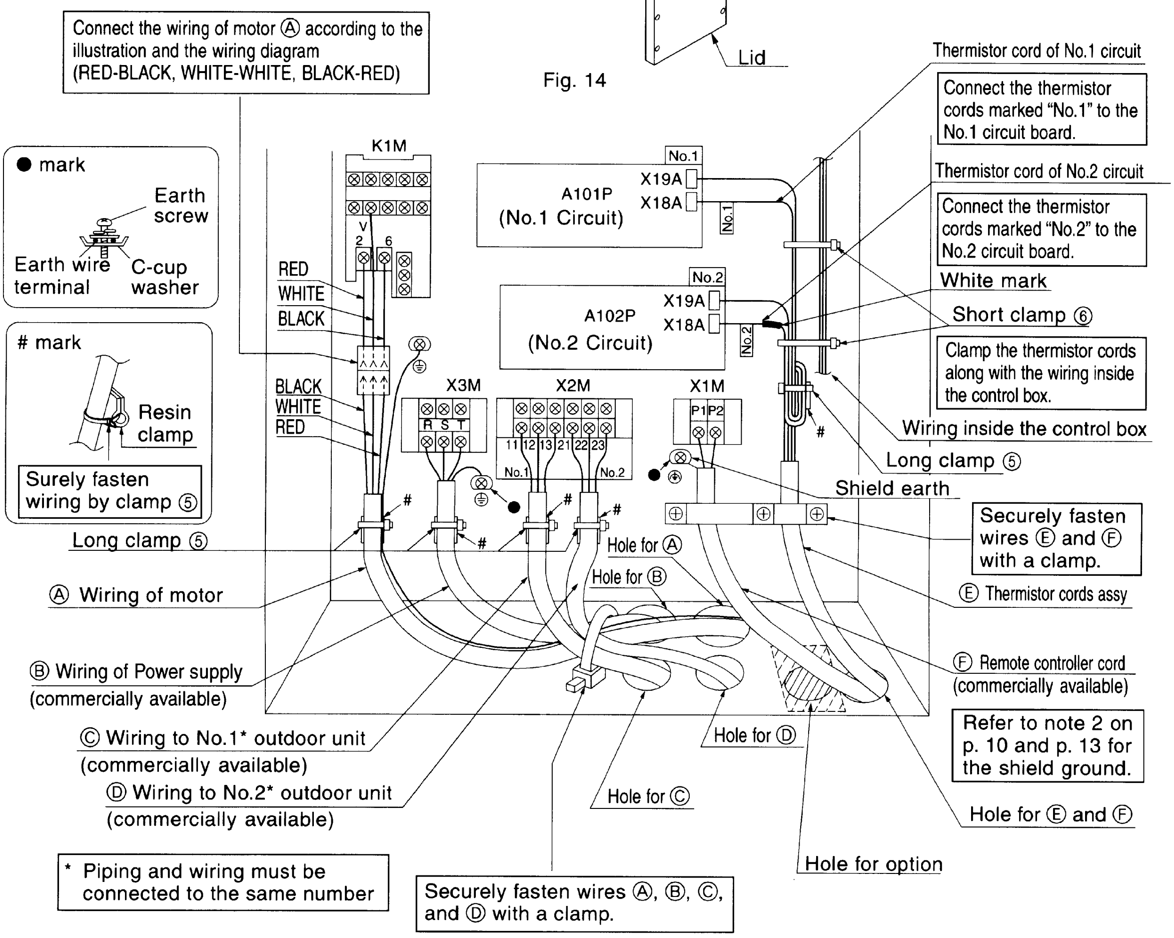


Fig. 15

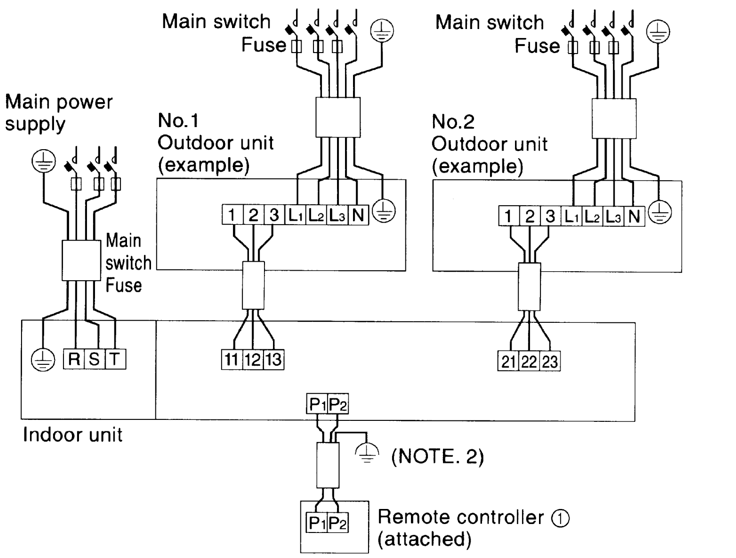
3PN00281-22S-12

1.2.4 Wiring Example

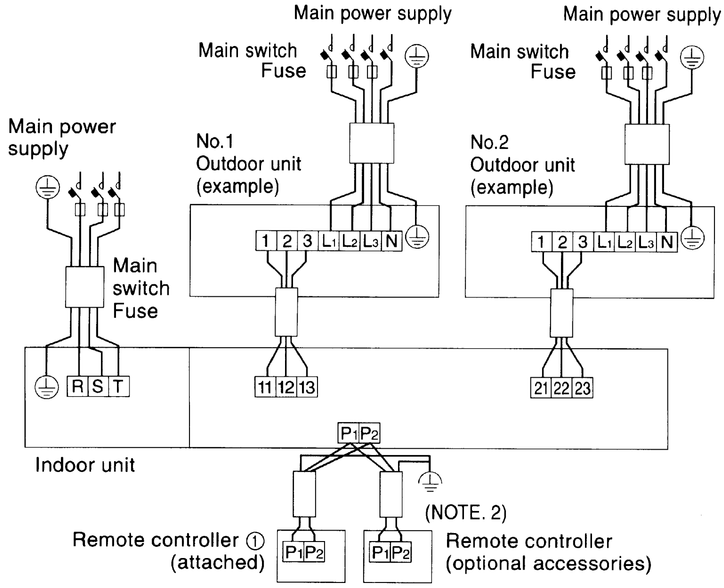
(For the wiring of outdoor units, refer to the installation manual attached to the outdoor unit.)
Confirm the system type.

- Standard system: 1 remote controller controls 1 indoor unit.
- 2 remote controllers control: 2 remote controllers control 1 indoor unit.
- Group control can not be used for this model.

Standard System



Control by 2 remote controllers



NOTE) 1. All transmission wiring except for the remote controller wires must match the terminal symbol.
2. If using shield wire for transmission wiring, ground the shield of the shield wire to "⏚", at the grounding screw of the remote controller cord grounding terminal inside the control box. (Refer to Fig.15)

3PN00281-22S-13

1.2.5 Test Operation

⟨⟨ Refer to the section of "FOR THE FOLLOWING ITEMS, TAKE SPECIAL CARE DURING CONSTRUCTION AND CHECK AFTER INSTALLATION IS FINISHED" ⟩⟩

(1) Check the tension of the fan belt before test operation.
Proper tension of the fan belt is approx. 4mm of relaxation when it is pressed lightly by finger.

(2) Open the gas side stop valve.

(3) Open the liquid side stop valve.

(4) Electrify crank case heater for 6 hours.

(5) Set to cooling operation with the remote controller and start operation by pushing ON/OFF button. (⏻)

(6) Press Inspection/Test Operation button 4 times (TEST) and operate at Test Operation mode for 3 minutes.

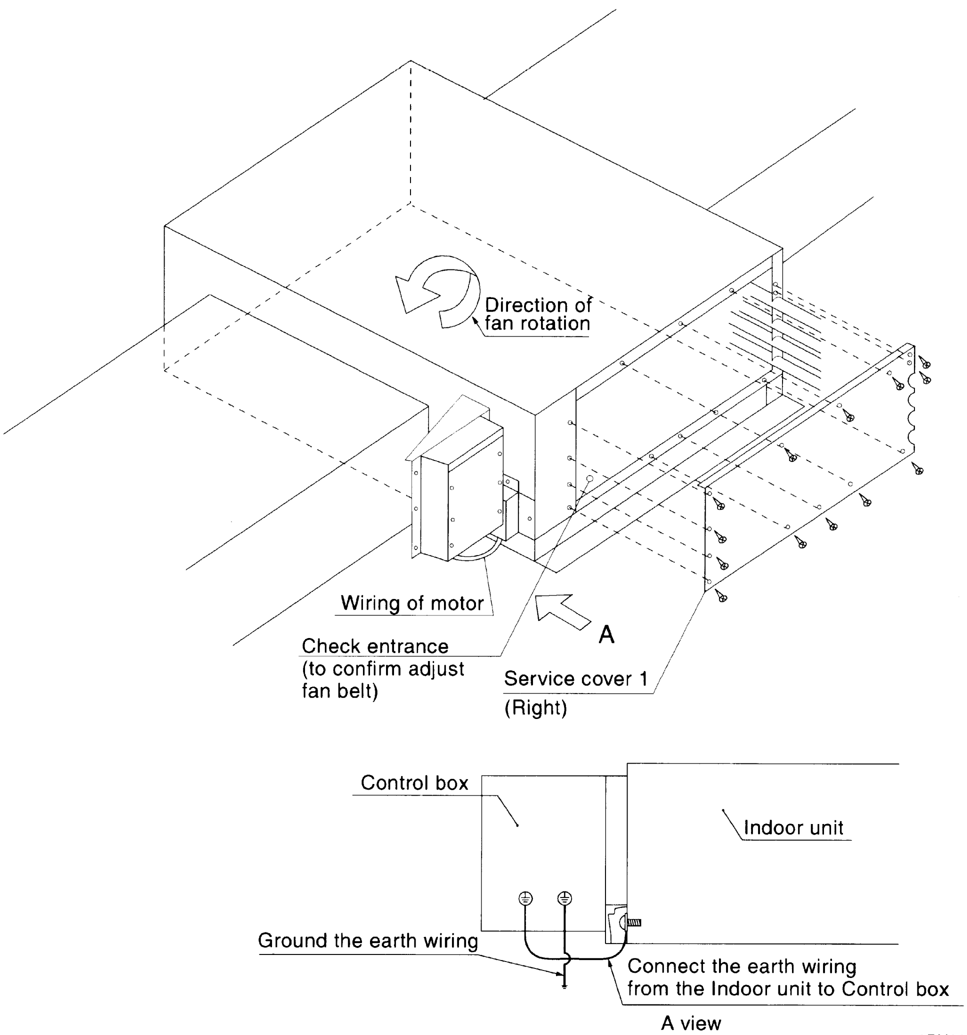
(7) Press Inspection/Test Operation button (TEST) and operate normally.

(8) Confirm function of unit according to the operation manual.

(9) Confirm the direction of fan rotation.

(10) Check the earth wiring was connected.

⟨ **PRECAUTIONS** ⟩ 1. In case something is wrong with the unit and it does not operate, refer to the malfunction diagnosis label attached to the unit.



3PN00281-22S-15

1.3 RY140KU

Maximum Allowable Piping Length and Level Difference

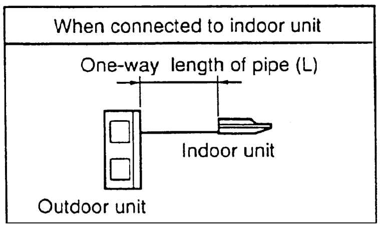
	RY140KU
Max. Allowable Piping Length	50 m (Equivalent Length 70 m)
Max. Allowable Level Difference	30 m

Additional Refrigerant Charge

■ **RY140KU**

This unit requires additional charging of refrigerant according to the length of pipe connected at the site. When the entire refrigerant pipe length is within 30 meters, the additional changing is not needed.
Take the following steps for proper charging.
Refer to Figure 1 for refrigerant pipe one-way length.

Figure 1



1. Refrigerant charge amount

Additional charging of refrigerant

(a) Select the appropriate refrigerant charging amount from Table 1 and charge the refrigerant.
(b) Mark circle on the selected amount in the tables which in a nameplate affixed inside the front panel(right) for future servicing.

Table 1 Additional charging amount.< unit : kg >
The maximum allowable pipe length is 50 meters.

Length of pipe connected(L)		30 m or less	More than 30 m and 50 m or less
Heat pump type	RY140	—	1.5

2. Recharging refrigerant

(a) When the entire refrigerant pipe length is within 30 meters, charge the refrigerant in accordannce with the amount mentioned on the nameplate, and when the pipe length exceeds 30 meters, the charging amount is an addition of the amount stated on the nameplate and the additional charging amount.

(P1019)

3. Precautions for Pumping-Down Operation

The outdoor unit is equipped with a low-pressure switch to protect the compressor. Take the following steps to perform the pumping-down operation.

Caution Never short-circuit the low-pressure switch in this operation.

Procedure	Precautions
1. Start the fan operation with the remote controller.	Confirm that stop valves both on the liquid and gas side are open. Take care when the procedure 2 is done first because the indoor unit fan may operate automatically.
2. Push the pumping-down button on the PC board of the outdoor unit.	Compressor and outdoor fan will start operation automatically.
3. Continue operation for 1 min. until operation condition stabilizes.	—
4. Close the stop valve on the liquid side securely. (Refer to Fig. 13)	Insecure closing of the valve may result in burning of the compressor.
5. When the low-pressure switch is activated, the unit stops working. At this time, close the stop valve on the gas side.	—

This is the end of pumpingdown operation.
After pumpingdown operation, the remote controller shows “U4” even when ON button on the remote controller is pressed, and it will not operate.Although the remote controller may or may not indicate “U4” according to circumstances at this time, it is normal. When the remote controller indicates “U4”, the indoor unit fan may operate. (for about max 30 minutes) Turn off the main power supply switch and turn it on again in need of operation.

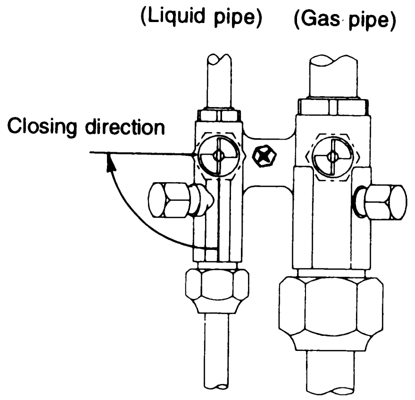
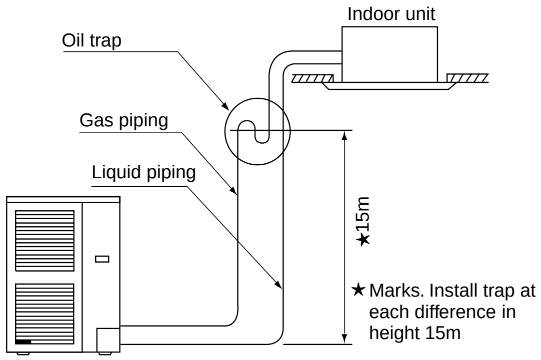


Fig. 13
(P1020)

■ **Necessity of a trap**

Since there is fear of the oil held inside the riser piping flowing back into the compressor when stopped and causing liquid compression phenomenon, or cases of deterioration of oil return, it will be necessary to provide a trap at an appropriate place in the riser gas piping.

■ **Trap installation spacing**



(P1021)

Note: A trap is not necessary when the outdoor unit is installed in a higher position than the indoor unit.

1.4 RY200KU / RY250KU

Maximum Allowable Piping Length and Difference

SELECTION OF PIPING MATERIAL

- Use pipes of the following material.
  Phosphorous deoxidized seamless copper tube for piping.

REFRIGERANT PIPING WORK PROCEDURES

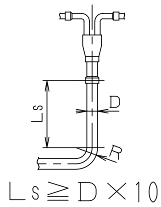
- Be sure to perform piping work within the range of the minimum allowable pipe length, maximum allowable pipe length and maximum allowable level difference etc. shown in the table and the figure below.

THE PIPING FOR SIMULTANEOUS OPERATION SYSTEM

- Use branch piping kit (optional accessory) for branching of refrigerant pipes. When using this, follow the following precautions.
  (For details, refer to the manual attached to branch piping kit.)

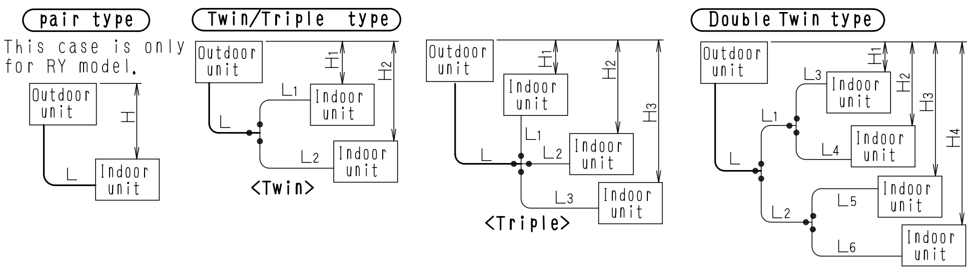
★1. Install the branch pipes horizontally. (Maximum inclination : 20 degrees or less)
★2. Length of branch pipe to indoor unit should be short as possible. (maximum length : 20 meters or less)
★3. Try to keep length of the branch pipes to the indoor unit equal. (Maximum allowable length difference : 10 meters or less)

- Upward and downward piping should be performed at the main piping line.
- In case of connecting main pipe (between this kit and the outdoor unit) to this kit, do not bend the main pipe near the connection. If not possible, ensure the required straight portion (Ls) as shown on right figure.



1PN04787-1A-1

Outdoor Unit	RY200·250 Type (Y1, TAL, YAL) R200·250 Type (Y1, TAL, YAL)		
	Pair Type	Twin / Triple Type	Double Twin Type
Minimum allowable pipe length	L≥5m	L+Max(L_1, L_2, L_3)≥5m	L+Max(L_1, L_2)+Max(L_3, L_4, L_5, L_6) ≥5m
Maximum allowable pipe length (The equivalent length)	L≤5m (70m)	L+Max(L_1, L_2, L_3)≤50m (70m)	L+Max(L_1, L_2)+Max(L_3, L_4, L_5, L_6) ≤50m (70m)
Maximum allowable length of branch pipe		Max(L_1, L_2, L_3)≤20m	Max(L_1, L_2)+Max(L_3, L_4, L_5, L_6)≤20m
Maximum allowable length difference of branch pipe (Note1 In case of L_1≤L_2, L_3≤L_4, L_5≤L_6)		L_A–L_B≤10m or L_C–L_D≤10m L_A=Max(L_1, L_2) L_B=Min(L_1, L_2) L_C=Max(L_1, L_2, L_3) L_D=Min(L_1, L_2, L_3)	(L_2+ L_6)–(L_1+ L_3)≤10m (Note1) and L_A–L_B≤10m and L_E–L_F≤10m and L_G–L_H≤10m L_A=Max(L_1, L_2) L_B=Min(L_1, L_2) L_E=Max(L_3, L_4) L_F=Min(L_3, L_4) L_G=Max(L_5, L_6) L_H=Min(L_5, L_6)
Maximum allowable level difference	H≤30m	Max(H_1, H_2, H_3)≤30m	Max(H_1, H_2, H_3, H_4)≤30m
Maximum allowable level difference between one indoor unit and another		H_A–H_B≤0.5m Max(H_1, H_2, H_3)=H_A Min(H_1, H_2, H_3)=H_B	H_C–H_D≤0.5m Max(H_1, H_2, H_3, H_4)=H_C Min(H_1, H_2, H_3, H_4)=H_D



1PN04787-1A-2

Additional Refrigerant Charge

LEAKAGE-TEST, VACUUM DEHYDRATION

After the piping is completed, check the system according to the following procedures. (Refer to the figure on the right below.)

1. Evacuate the pipes and check vacuum. (No pressure increase for 1 minute.)
2. Charge Nitrogen gas.
3. Conduct leak test by applying sope water, etc. to the connecting part of the pipes.
4. Discharge Nitrogen.
5. Evacuate and check vacuum again.
6. Inject the refrigerant (additional charging amount) into the refrigerant pipe from liquid side service port.
7. Open the stop valve.

ADDITIONAL CHARGING AMOUNT OF REFRIGERANT

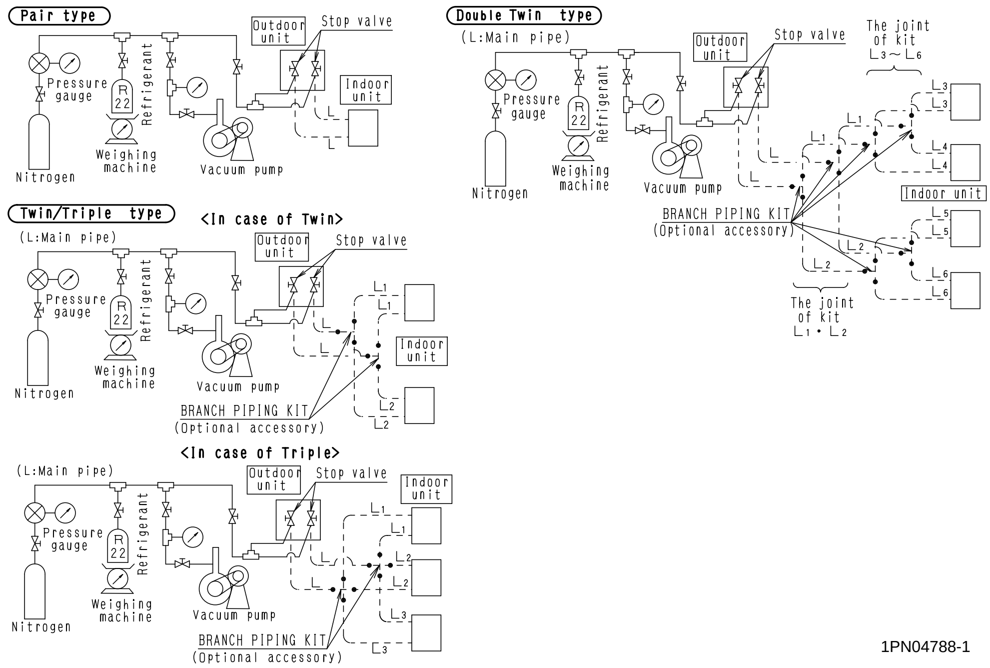
- When one way length of pipe exceeds 5m, charge the refrigerant amount shown below. Enter the additional charging amount in the label stuck on the back side of the switch box lid. This is indispensable at servicing. (Refer to the label.)
- After dehydrating, charge the specified additional refrigerant from the liquid side service port. (Refer to the figure on the next page.)
- Pipe size and additional refrigerant charging amount are as follows.

Outdoor unit		R(Y)200 type (Y1, TAL, YAL)		R(Y)250 type (Y1, TAL, YAL)	
	Piping length (m)	Refrigerant pipe size		Refrigerant Pipe size	
		Gas side pipe	Liquid side pipe	Gas side pipe	Liquid side pipe
Pair	L	ϕ25.4×t1.2mm	ϕ12.7×t0.9mm	ϕ28.6×t1.4mm	ϕ15.9×t1.0mm
Twin	L	ϕ25.4×t1.2mm	ϕ12.7×t0.9mm	ϕ28.6×t1.4mm	ϕ15.9×t1.0mm
	L_1, L_2	ϕ19.1×t1.0mm	ϕ9.5×t0.8mm	ϕ19.1×t1.0mm	ϕ9.5×t0.8mm
Triple	L	ϕ25.4×t1.2mm	ϕ12.7×t0.9mm	—	—
	L_1~L_3	ϕ15.9×t1.0mm	ϕ9.5×t0.8mm	—	—
Double Twin	L	ϕ25.4×t1.2mm	ϕ12.7×t0.9mm	ϕ28.6×t1.4mm	ϕ15.9×t1.0mm
	L_1, L_2	ϕ19.1×t1.0mm	ϕ9.5×t0.8mm	ϕ19.1×t1.0mm	ϕ9.5×t0.8mm
	L_3~L_6	ϕ15.9×t1.0mm	ϕ6.4×t0.8mm	ϕ15.9×t1.0mm	ϕ6.4×t0.8mm

(1) Case of RY series (Heat Pump) type

Liquid pipe size (mm)	One-way length of pipe (L) and additional charge amount (kg)									
	5m or less	10m or less	15m or less	20m or less	25m or less	30m or less	35m or less	40m or less	45m or less	50m or less
ϕ12.7	—	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50
ϕ15.9	—	0.70	1.40	2.10	2.80	3.50	4.20	4.90	5.60	6.30

Liquid pipe size (mm)	One-way length of pipe (L) and additional charge amount (kg)			
	5m or less	10m or less	15m or less	20m or less
ϕ6.4	0.15	0.30	0.45	0.60
ϕ9.5	0.25	0.50	0.75	1.00



1PN04788-1

<Note>
Incase of Double Twin type.
Adopt the value for the additional charging amount of the branch pipe.
L1 & L2 : the value of ϕ9.5
L3 ~ L6 : the value of ϕ6.4

<Example>
How to calculate the additional refrigerant charging amount as shown below. (In case of RY250KU)

Pair type
One-way length of pipe
: L=26m
The additional charging amount
=3.5kg

Twin / Triple type
One-way length of pipe
: L=26m
: L1=14m
: L2=11m
The additional charging amount
=3.5+0.75+0.75
=5.0kg

Double Twin type
One-way length of pipe
: L=26m
: L1=14m
: L2=11m
: L3=6m
: L4=5m
: L5=3m
: L6=1m
The additional charging amount
=3.5+0.75+0.75+0.30+0.15+0.15+0.15
=5.75kg

Part 6
Field Setting

1. Method of Field Set (Reset after Maintenance Inspection/Repair)

1.1 Explanation

Field set is carried out from the remote controller. At time of installation, or after maintenance inspection/repair, carry out field set according to the explanation below. Incorrect settings will cause a malfunction to occur. (The indoor unit settings are sometimes changed if optional accessories are mounted on the indoor unit. Refer to the optional accessory manual.)

1.2 Field Setting

1.2.1 Wired Remote Controller

Notes: (Field setting must be made from the remote controller in accordance with the installation conditions.)

- Setting can be made by changing the “Mode number”, “FIRST CODE NO.”, and “SECOND CODE NO.”.
- Refer to the following procedures for Field setting.

Procedure **<BRC1B62>**

① When in the normal mode, press the “ TEST ” button for a minimum of four seconds, and the FIELD SET MODE is entered.

② Select the desired MODE NO. with the “ ” button.

③ During group control, when setting by each indoor unit (mode No. 20, 21 and 23 have been selected), push the “ ” button and select the INDOOR UNIT NO to be set. (This operation is unnecessary when setting by group.)

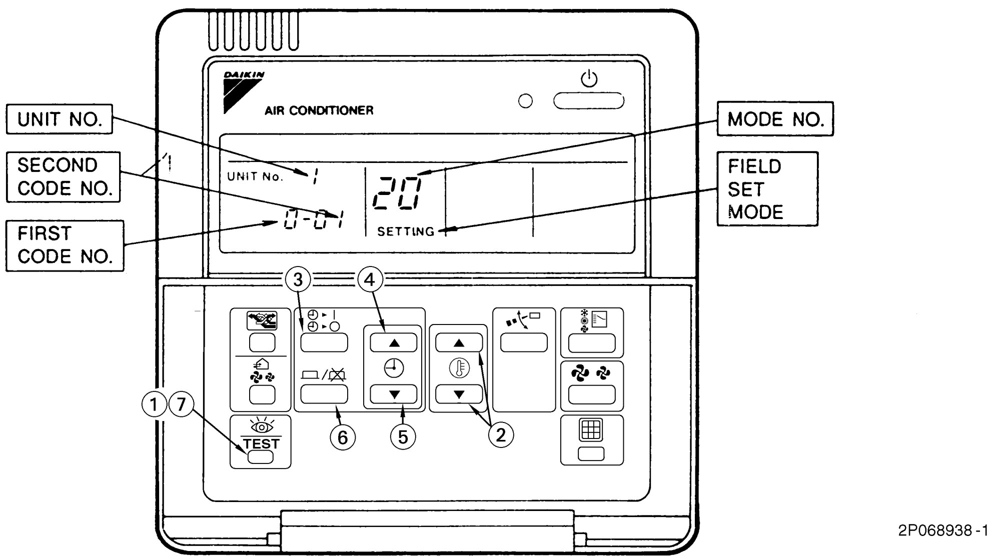
④ Push the “ ” upper button and select FIRST CODE NO.

⑤ Push the “ ” lower button and select the SECOND CODE NO.

⑥ Push the “ ” button once and the present settings are SET.

⑦ Push the “ TEST ” button for about one second to return to the NORMAL MODE.

(Example) If during group setting and the time to clean air filter is set to FILTER CONTAMINATION - HEAVY, SET MODE NO. to “10,” FIRST CODE NO. to “0,” and SECOND CODE NO. to “02.”



<BRC1C61> For FDY-KA model only

① When in the normal mode, press the " TEST " button for a minimum of four seconds, and the FIELD SET MODE is entered.

② Select the desired MODE NO. with the " ▲ ▼ " button.

③ During group control, when setting by each indoor unit (mode No. 20, 21 and 23 have been selected), push the " ⏲▸I ⏲▸O " button and select the INDOOR UNIT NO to be set. (This operation is unnecessary when setting by group.)

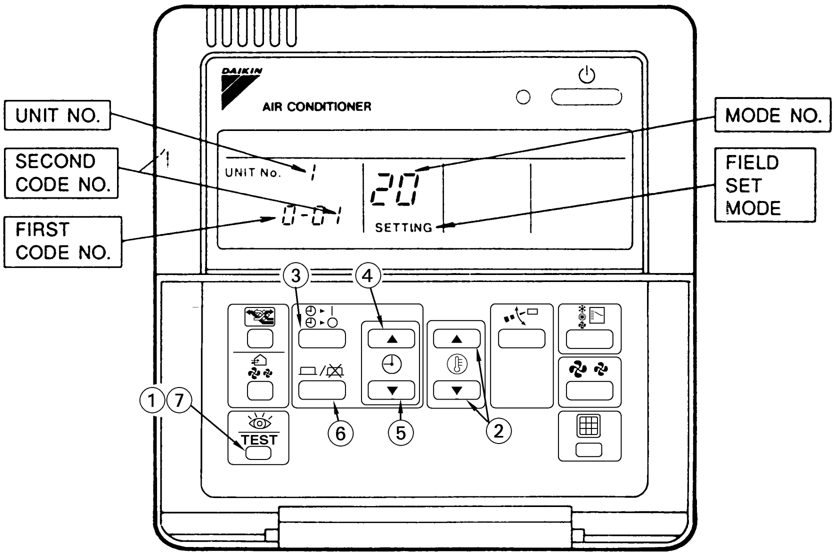
④ Push the " ▲ ⏲ " upper button and select FIRST CODE NO.

⑤ Push the " ⏲ ▼ " lower button and select the SECOND CODE NO.

⑥ Push the " " button once and the present settings are SET.

⑦ Push the " TEST " button for about one second to return to the NORMAL MODE.

(Example) If during group setting and the time to clean air filter is set to FILTER CONTAMINATION - HEAVY, SET MODE NO. to "10," FIRST CODE NO. to "0," and SECOND CODE NO. to "02."



2P068938-1

1.2.2 Wireless Remote Controller

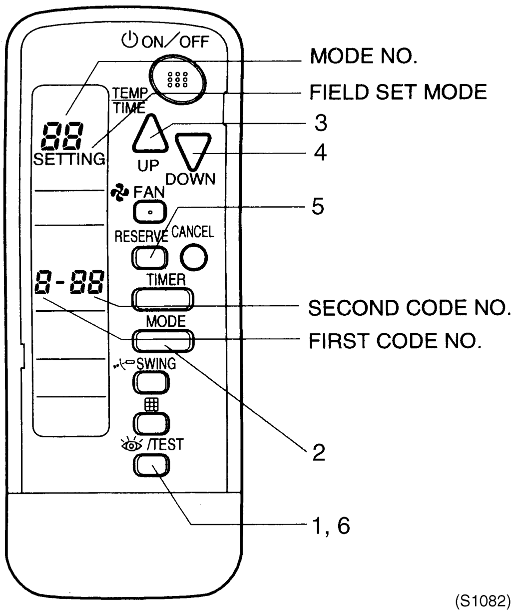
Note: If optional accessories are mounted on the indoor unit, the indoor unit setting may have to be changed. Refer to the instruction manual (optional hand book) for each optional accessory.

Procedure

<BRC4C62> For FDY-KA model only

1. When in the normal mode, push the " /TEST " button for a minimum of four seconds, and the FIELD SET MODE is entered.
2. Select the desired MODE NO. with the " MODE " button.
3. Push the " UP " button and select the FIRST CODE NO.
4. Push the " DOWN " button and select the SECOND CODE NO.
5. Push the " RESERVE " button and the present settings are SET.

Push the " /TEST " button to return to the NORMAL MODE.



(S1082)

1.2.3 Field Setting

〈 **Field setting must be made from the remote controller in accordance with the installation condition.** 〉

- Setting can be made by changing the "Mode number", "FIRST CODE No.", and "SECOND CODE No.".
- For setting and operation, refer to the "FIELD SETTING" in the installation manual of the remote controller.

Auto restart

- It is possible to restart automatically when power supply returns after power supply failure.
- Change to the SECOND CODE No.2 according to Table 3.

※ SECOND CODE No. is factory set to "01"

Table 3

Setting	Mode No.	FIRST CODE No.	SECOND CODE No.
Not auto restart	12	5	01
Auto restart			02

Setting air filter sign

- Change to the SECOND CODE No. 02 according to Table 4.

※ SECOND CODE No. is factory set to "01" for [ON]

- Filter maintenance should be carried out which is appropriate to the type of filter in use.

Table 4

Setting	Mode No.	FIRST CODE No.	SECOND CODE No.
Filter sign indication [ON]	10	3	01
Filter sign indication [OFF]			02

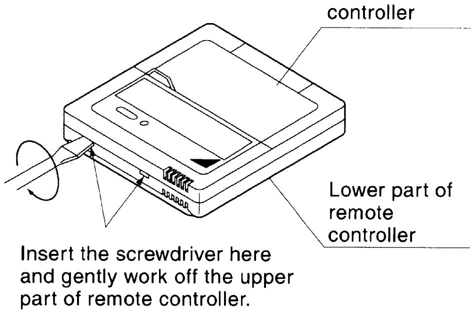
Control by 2 Remote Controllers (Controlling 1 indoor unit by 2 remote controllers)

- When using 2 remote controllers, one must be set to "MAIN" and the other to "SUB".
- The other remote controller is required. (Optional remote controller model: BRC1C51)

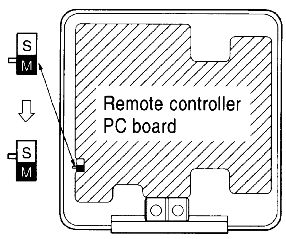
〈 **MAIN/SUB CHANGEOVER** 〉

(1) Insert a ⊖ screwdriver into the recess between the upper and lower part of remote controller and, working from the 2 positions, pry off the upper part.

(The remote controller PC board is attached to the upper part of remote controller.)



(2) Turn the main/sub changeover switch on one of the two remote controller PC boards to "S". (Leave the switch of the other remote controller set to "M".)



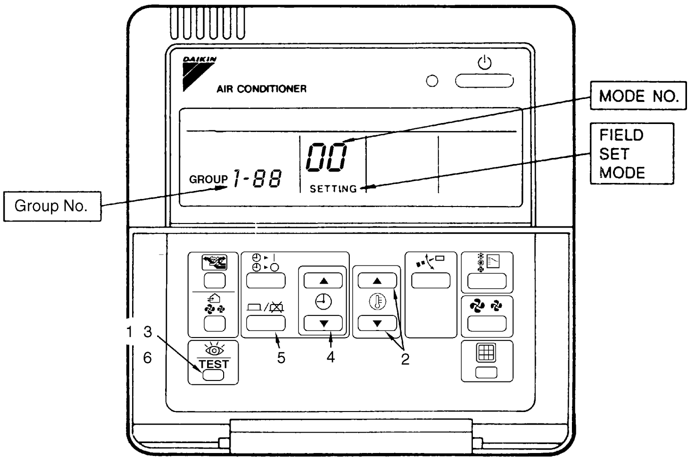
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1.3 Centralized Group No. Setting (5~10HP Models Only)

- If carrying out centralized control with a central remote controller and unified ON/OFF controller, you have to set the group No. for each group by remote controller.
- To set the group No., first turn on the power supply of the central remote controller, unified ON/OFF controller and indoor unit.

Centralized Group No. Setting by Remote Controller.

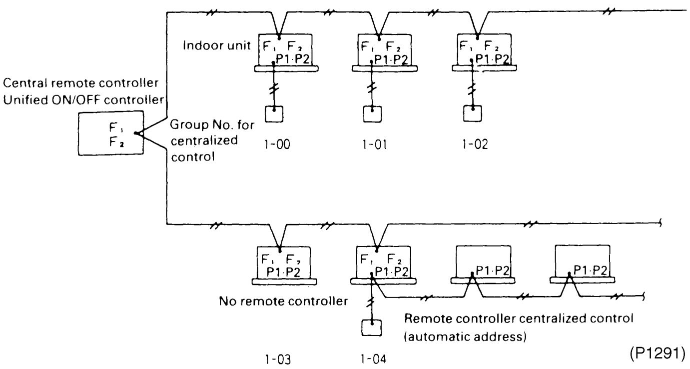
1. If the inspection/test button is pushed for 4 seconds or more when in the normal mode, operation enters the “field set mode.”
2. Using the temperature control buttons, set the mode No. to “00.”
3. Push the inspection/test button to inspect the group No. display.
4. Using the programming time button, set the group No. for each group. (Group No. rises in the order of 1-00, 1-01, ...1-15, 2-00 ...4-15, etc. The unified ON/OFF controller however displays only the range of group numbers selected by the switch for setting each address.)
5. Push the timer ON/OFF button and enter the selected group No.
6. Push the inspection/test button and return to the normal mode.



(P1290)

∗ If the address has to be set individually for each unit for power consumption counting, etc., set the mode No. to “30.”

Group No. Setting Example



(P1291)

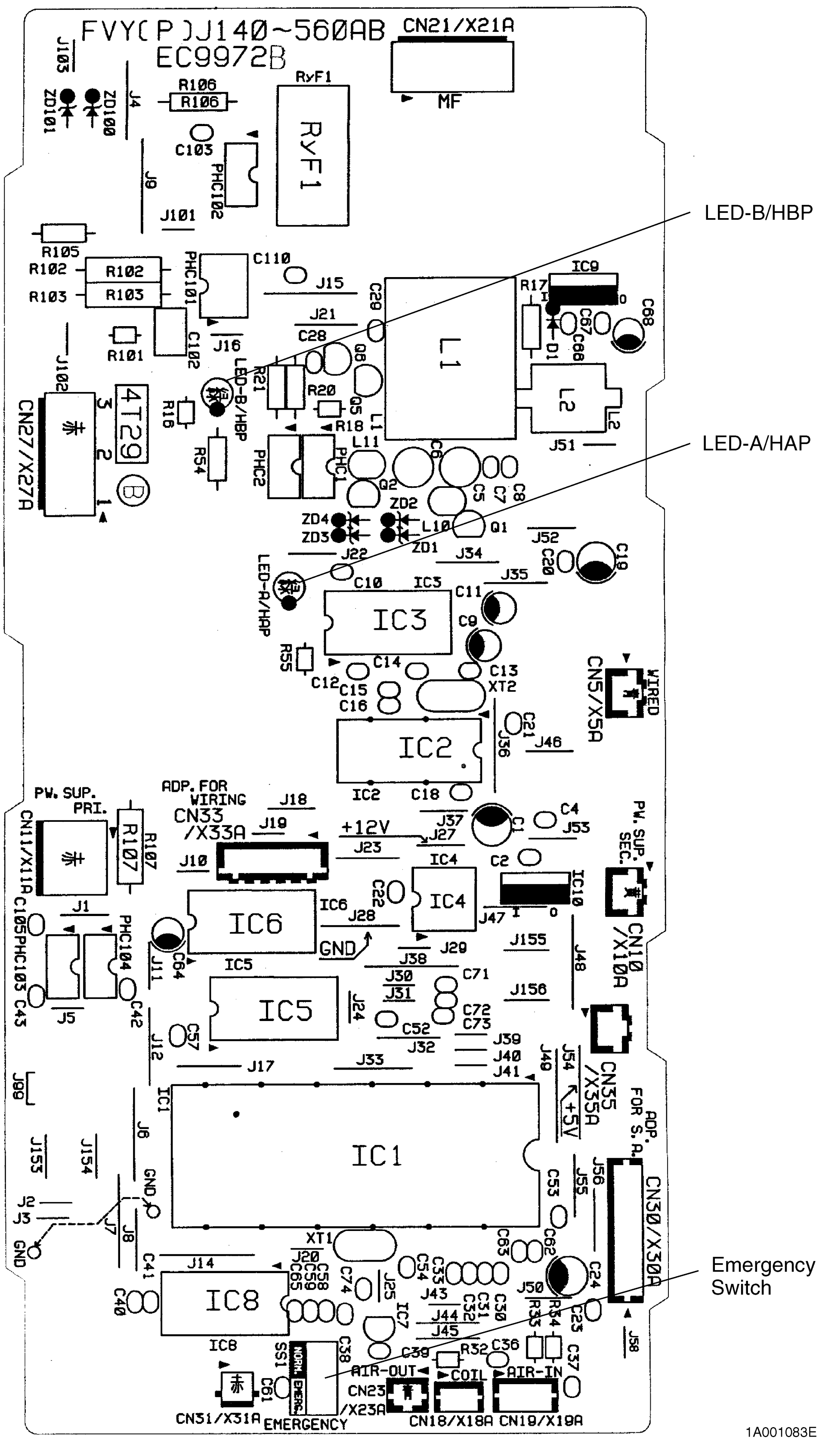
Note:

1. “F1,F2” indicates interface adaptor for SKY AIR series.
2. If not using remote controllers, temporarily connect a remote controller to set the group No., set the group No. for centralized control, and then disconnect the controller.

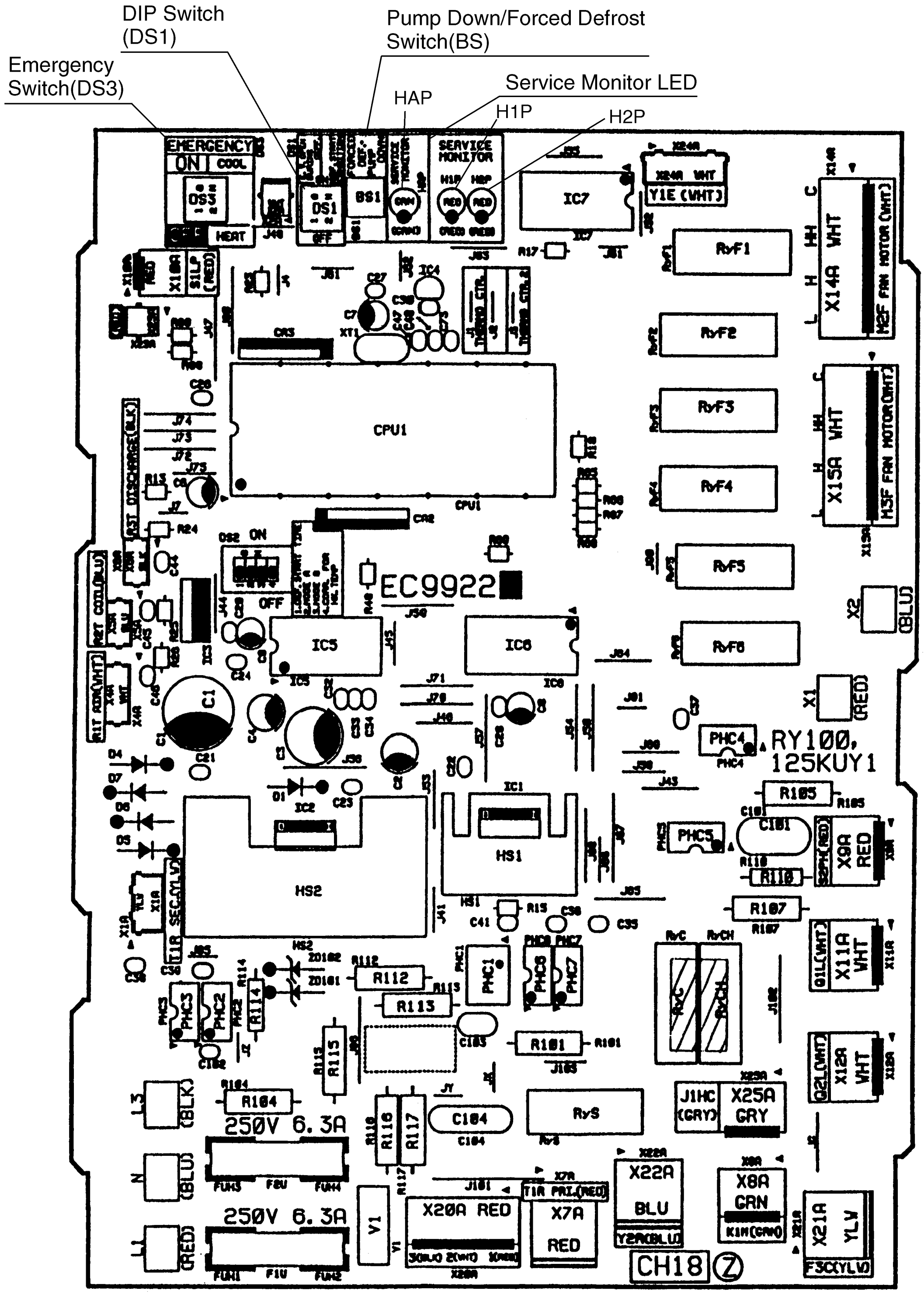
2. Settings Concerning Maintenance

2.1 Indoor Unit PCB

FDY06~20K(A)VE

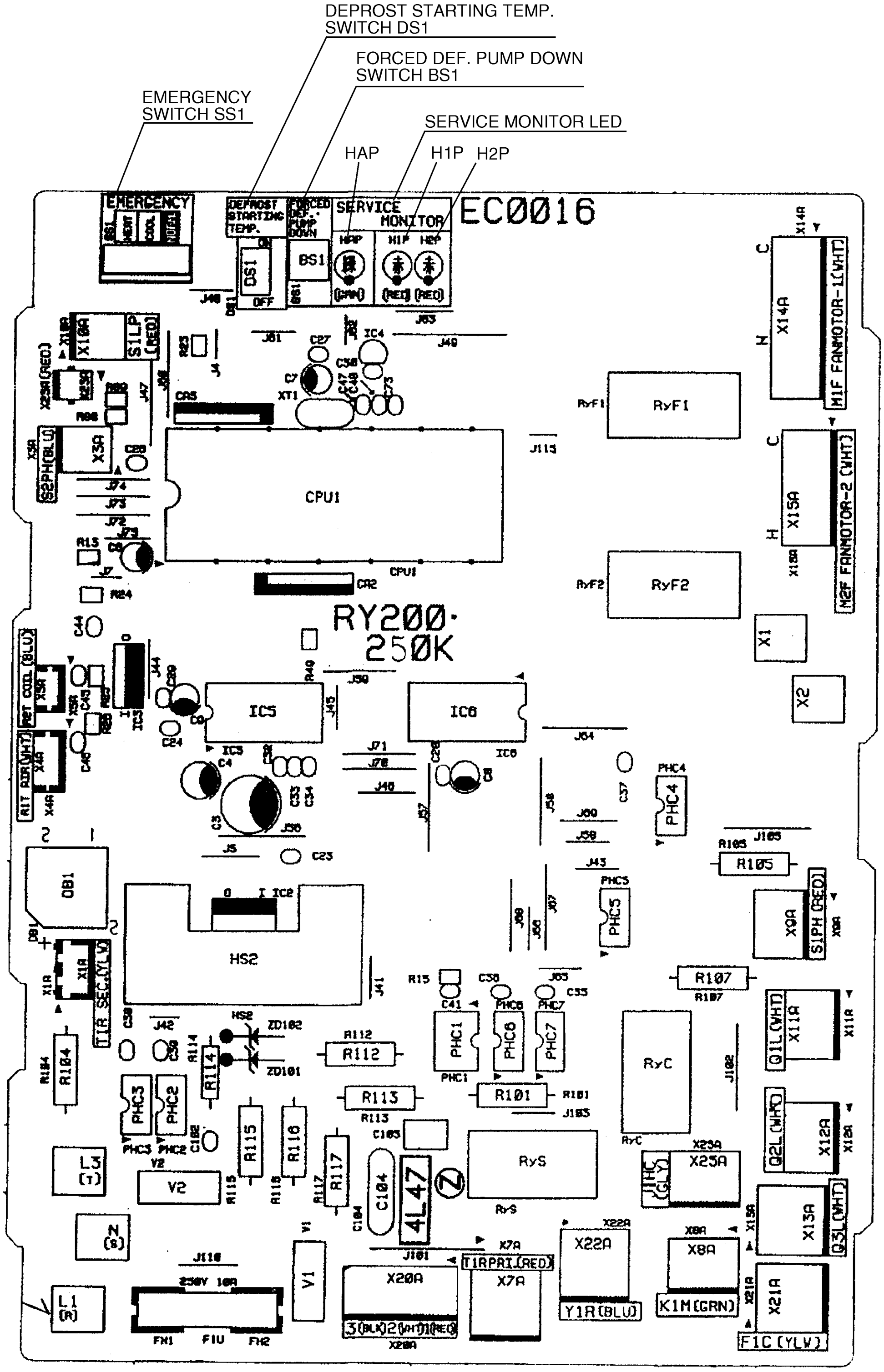


RY140KUY1



1P038541A

RY200 · 250KUY1



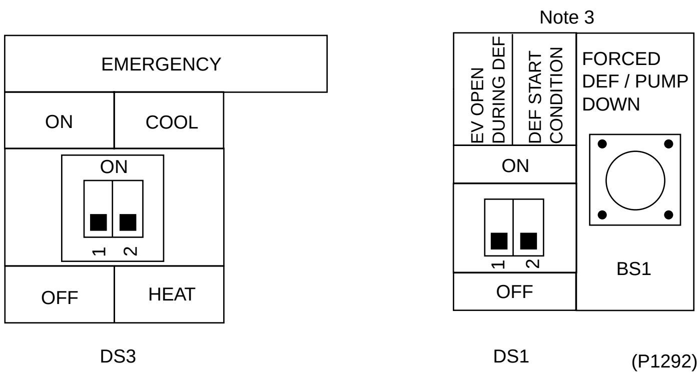
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3. Existence of DIP Switch, Jumper and BS

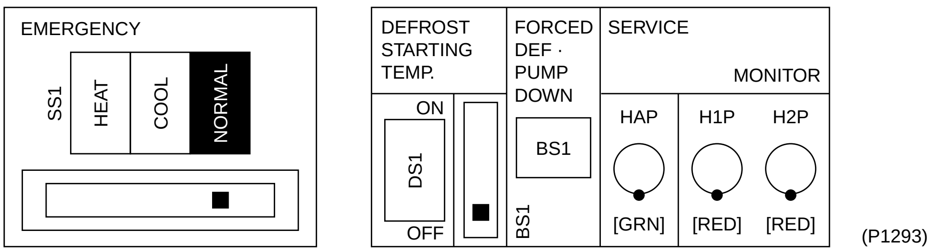
3.1 Reference Table

Model	PC Board Type	DIP Switch				Jumper	BS
		DS1		DS3			
		1	2	1	2	1	Pump Down / Forced Defrost
		E. V. Open During DEF.	DEF. Start Condition	EMERGENCY ON/ OFF	EMERGENCY COOL/ HEAT	Thermostat Control Changeover	
RY140KUY1	EC9922	○	○	○	○	○	○
RY200 · 250KUY1	EC0016		○	○	○		○

Note: Note 1
DIP Switch and BS Detail (140KU model)
<HEAP PUMP>



DIP Switch and BS Detail (R(Y)200 · 250 KU model)
<HEAT PUMP>



Note: Note 2
BS button (Pump down / Forced defrosting)
Pressing the BS button forcibly operates the air conditioner in the cooling mode.

1. To conduct a pump-down operation (sending refrigerant to outdoor unit), press the BS button to forcibly operate the equipment in the cooling mode, then operate the unit for about 1 minute to stabilize the system. After stabilizing system, close the liquid pipe stop valve on the outdoor unit, and after the pressure decreases and the low pressure switch activates, close the gas pipe stop valve.
2. Forced defrost
   To activate the defrost operation during the heating operation, press the BS button. This will activate the forced defrost operation (cooling operation).
   When the defrost cancel conditions are met, the equipment automatically switches off the defrost operation.

Note: Note 3 : Refer p.195 “Temperature conditions setting “ for more detail.

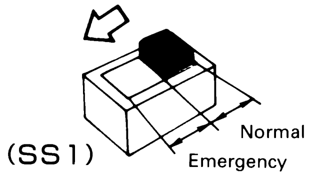
3.2 Emergency Operation

Emergency Operation of Indoor Units

You can operate the system manually by changing the setting of the emergency switch (SS1) on the indoor unit's PC board from "Normal" to "Emergency." When switched however the equipment cannot regulate temperature. The table below contains a list by model of actuators for manually operating indoor units in time of emergency.

Model	Fan	Drain Raising
FDY~K	○	—

■ Method of switching in time of emergency



(P1294)

Note:

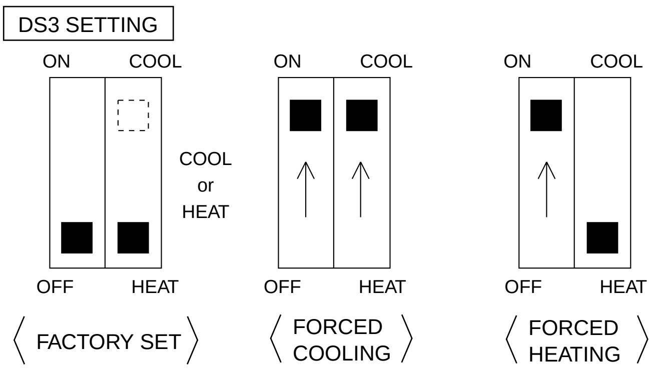
1. Do not operate from remote controller during emergency operation.
2. Operate the switch only when the power supply is turned OFF.

Emergency Operation of Outdoor Units

[In case of RY140KU model]

Turn off the power supply and set the emergency switch to "On" and "Heat" for heating or "Cool" for cooling. Operation will be started manually when you turn the power back on.

<HEAT PUMP>

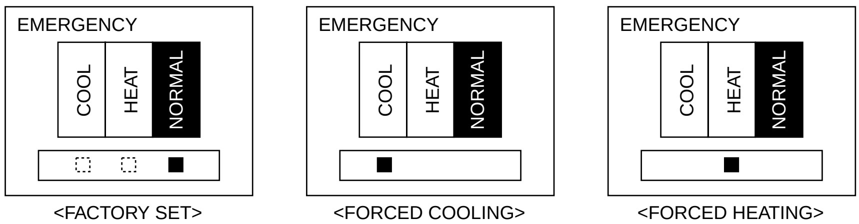


(S1295)

[In case of RY200 · 250KU model]

Turn off the power supply and set the emergency switch to "Heat" for heating or "Cool" for cooling. Operation will be started manually when you turn the power back on.

<HEAT PUMP>



(P1296)

Concerning Emergency Operation

If a safety device should be actuated during emergency operation, all actuators are turned OFF. If you reset after waiting for 3 minutes, operation will start again. Emergency operation cannot be carried out if the PC board itself is defective.

Note: For emergency operation, be sure to set emergency operation for both the indoor and outdoor units. Do not attempt to operate the equipment from the remote controller during emergency operation. Emergency operation is computer-controlled, and therefore cannot be carried out if the microcomputer is not operating properly.

The table below contains a list of actuators for manually operating the equipment in time of emergency.

Actuator	Cooling	Heating
Compressor	ON	ON
4-WAY VALVE	OFF	ON
Outdoor Unit Fan	ON	ON
Indoor Unit Fan	ON	ON

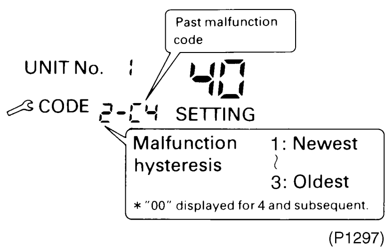
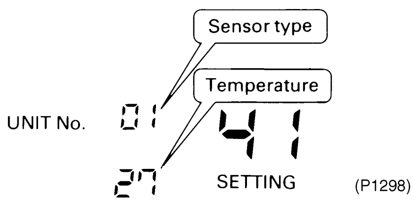
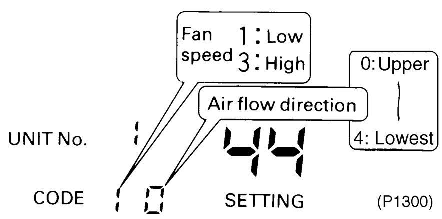
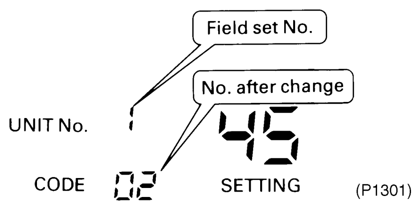
During emergency heating operation, defrosting is carried out for 3 minutes every hour. (4-way valve and outdoor unit fan are turned OFF.)

3.3 Maintenance Mode Setting

Procedure

1. Enter the field set mode.
   Continue to push the inspection / test operation button for a minimum of 4 seconds.
2. Enter the maintenance mode.
   After having entered the field set mode, continue to push the inspection / test operation button for a minimum of 4 seconds.
3. Select the mode No.
   Set the desired mode No. with the up/down temperature setting button.
4. Select the unit No.
   Select the indoor unit No. set with the time mode START/STOP button.
5. Carry out the necessary settings for each mode. (Modes 41, 44 and 45)
   See the table below for details.
6. Enter the setting contents. (Modes 44 and 45)
   Enter by pushing the timer ON/OFF button.
7. Return to the normal operation mode.
   Tap the inspection / test operation button one time.

Table

Mode No.	Function	Content and Operation Method	Example of Remote Controller Display
40	Malfunction Hysteresis	You can change the hysteresis with the programming time up-down button.	
41	Sensor Date Display	Select the display sensor with the programming time up-down button Display sensor 01 Suction 02 Heat exchange	
43	Forced Fan ON	Turns the fan ON for each unit individually.	
44	Individual Setting	Sets fan speed and air flow direction for each unit individually when using group control. Settings are made using the "air flow direction adjust" and "fan speed adjust" buttons.	
45	Unit No. Change	Changes unit No. Set the unit No. after changing with the programming time up-down button.	

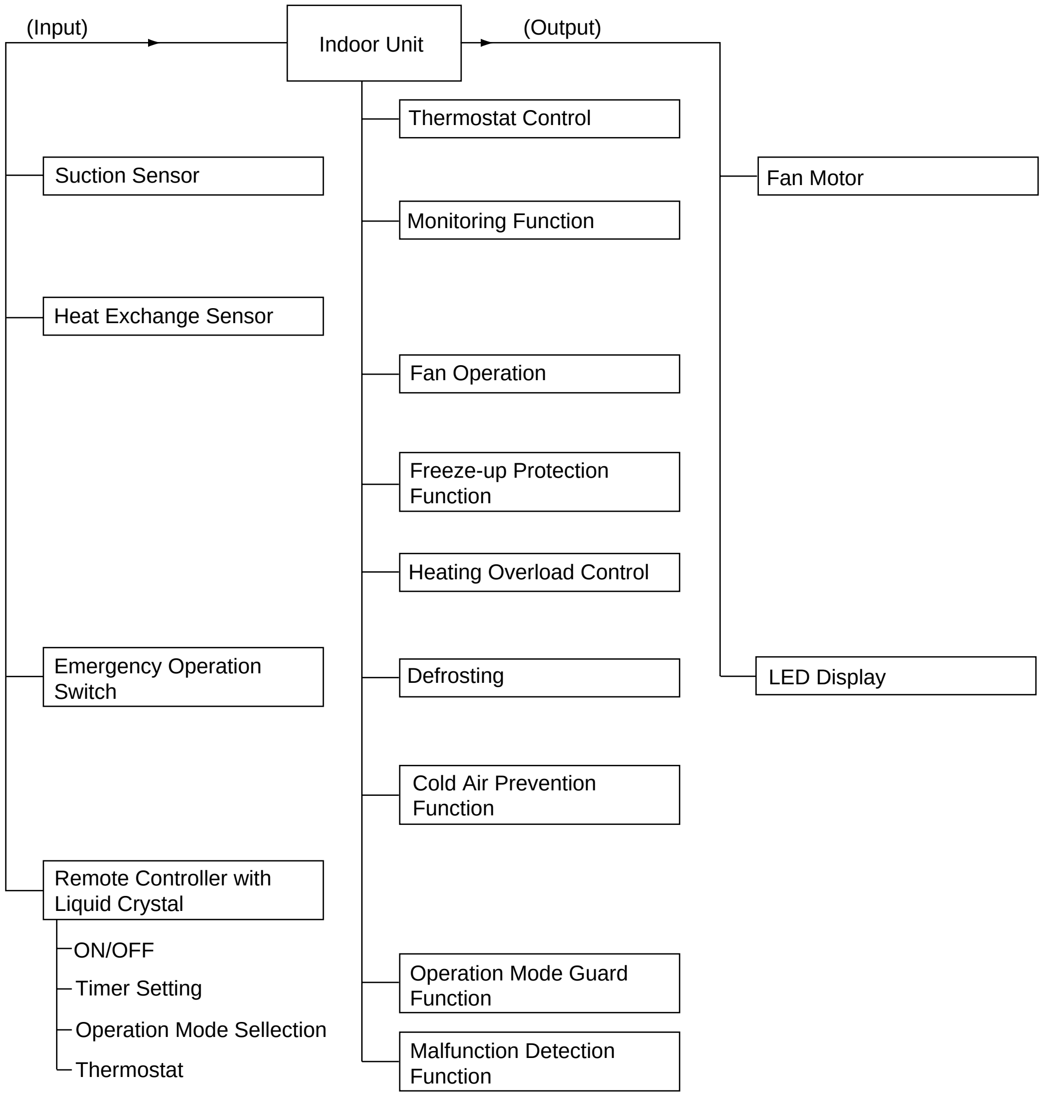
Operation is not reset by malfunction code reset for inspection.
(Cannot be reset because the count is updated each time a malfunction occurs.)

Part 7
Function and Operation

1. Function Outline

1.1 Indoor Unit

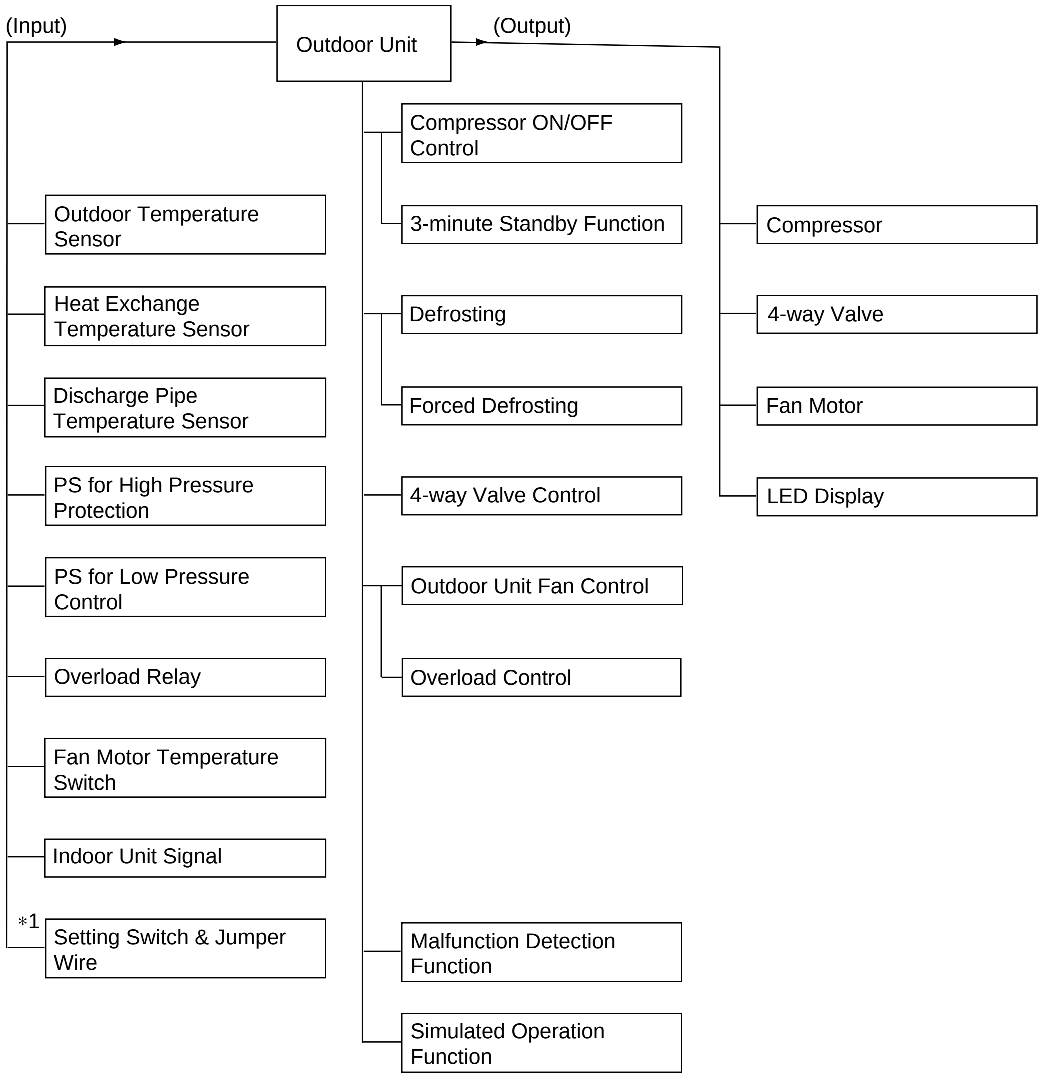
FDY



(P1302)

1.2 Outdoor Unit

RY-KU

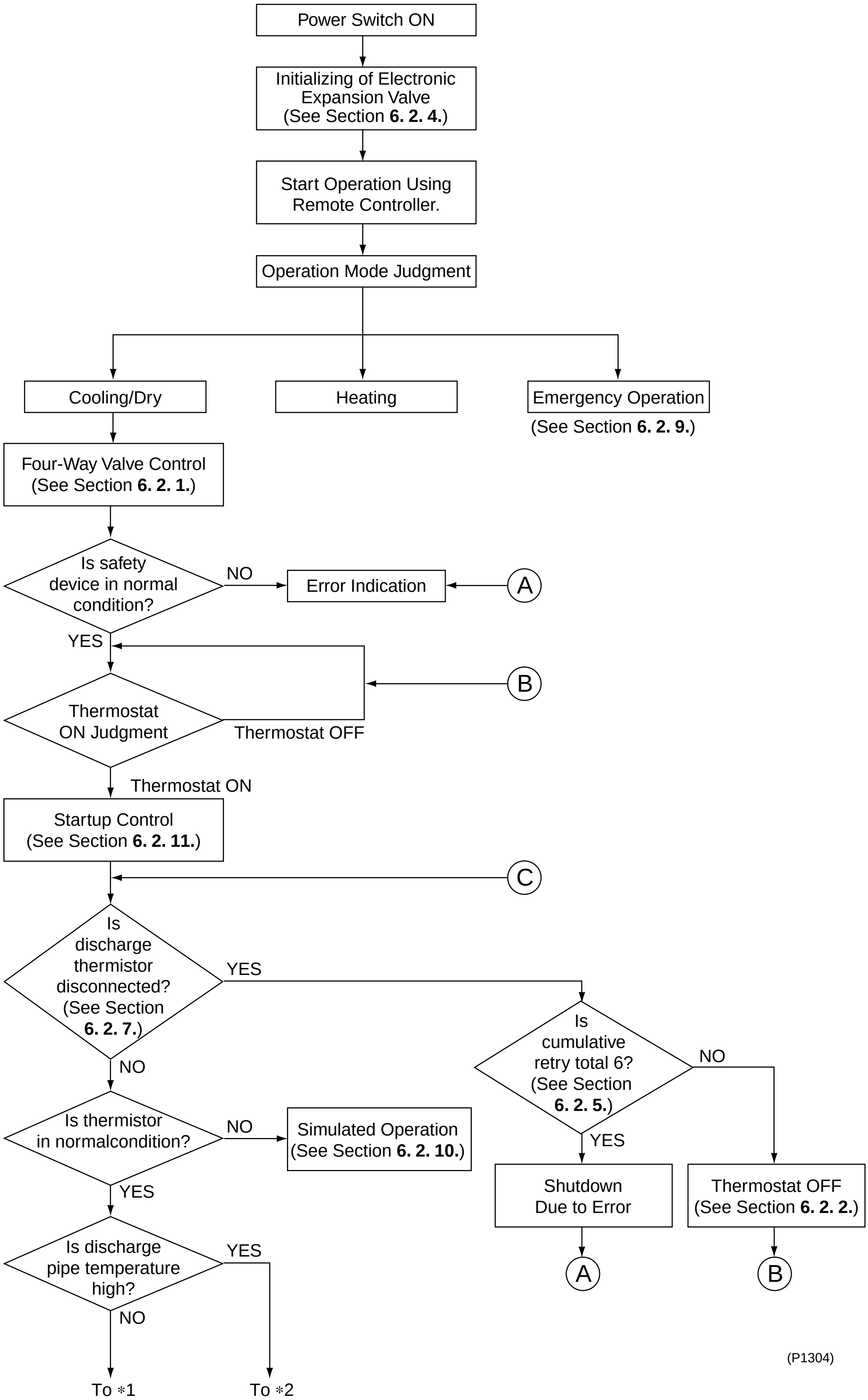


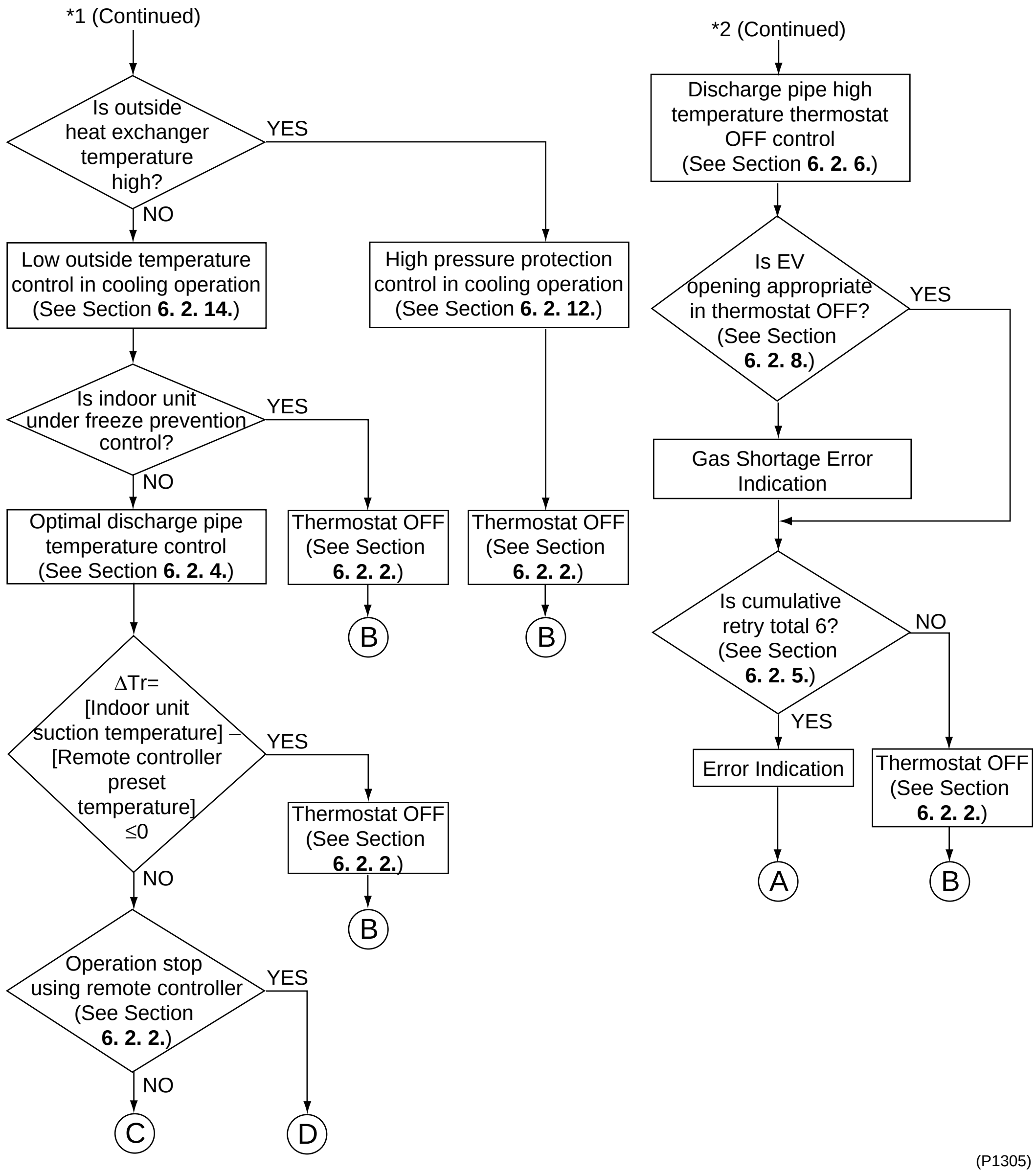
(P1303)

Refer “Existence of DIP Switch, Jumper and BS” on P161. (∗1)

2. Operation Flowchart (RY140KU)

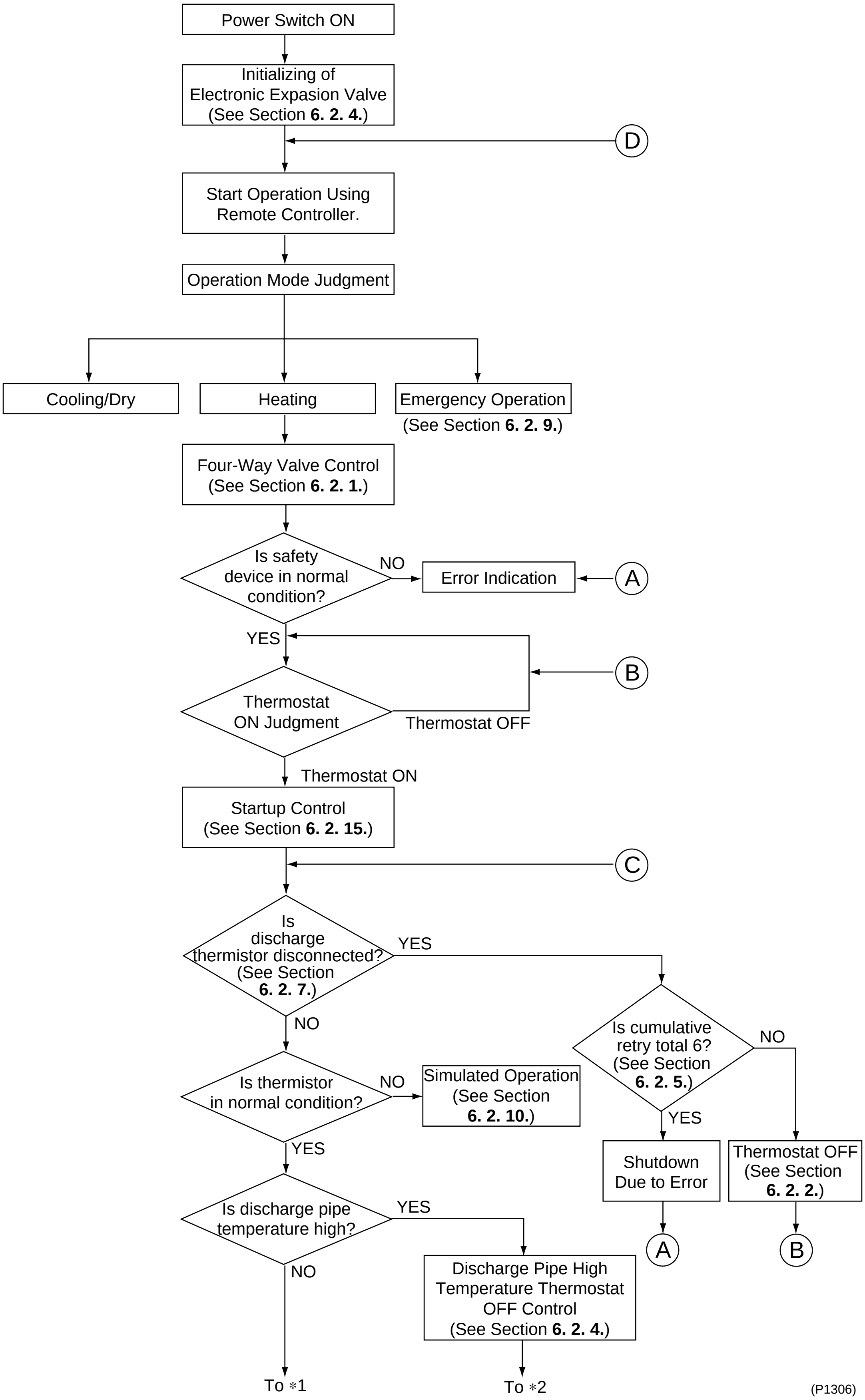
2.1 Cooling / Program Dry Operation

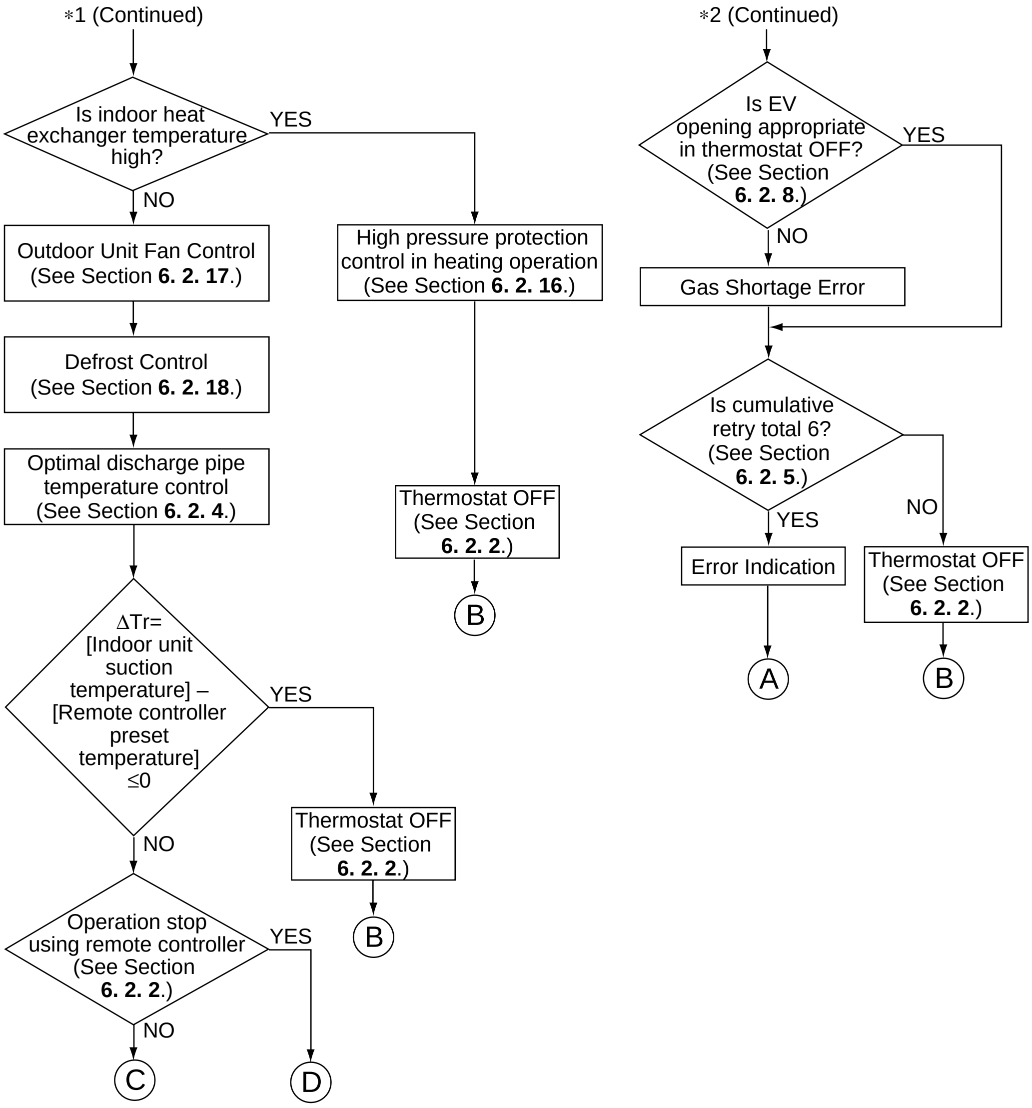




Note: For items indicated with reference section numbers 6.2.18 through 6.3.1, see the explanation of **outdoor unit** functions detail on pages 194 through 197.

2.2 Heating


Power Switch ON
Initializing of Electronic Expasion Valve (See Section 6. 2. 4.)
D
Start Operation Using Remote Controller.
Operation Mode Judgment
Cooling/Dry
Heating
Emergency Operation
(See Section 6. 2. 9.)
Four-Way Valve Control (See Section 6. 2. 1.)
Is safety device in normal condition?
NO
Error Indication
A
YES
B
Thermostat ON Judgment
Thermostat OFF
Thermostat ON
Startup Control (See Section 6. 2. 15.)
C
Is discharge thermistor disconnected? (See Section 6. 2. 7.)
YES
NO
Is cumulative retry total 6? (See Section 6. 2. 5.)
NO
YES
Is thermistor in normal condition?
NO
Simulated Operation (See Section 6. 2. 10.)
YES
Shutdown Due to Error
Thermostat OFF (See Section 6. 2. 2.)
Is discharge pipe temperature high?
YES
A
B
NO
Discharge Pipe High Temperature Thermostat OFF Control (See Section 6. 2. 4.)
To ∗1
To ∗2
(P1306)

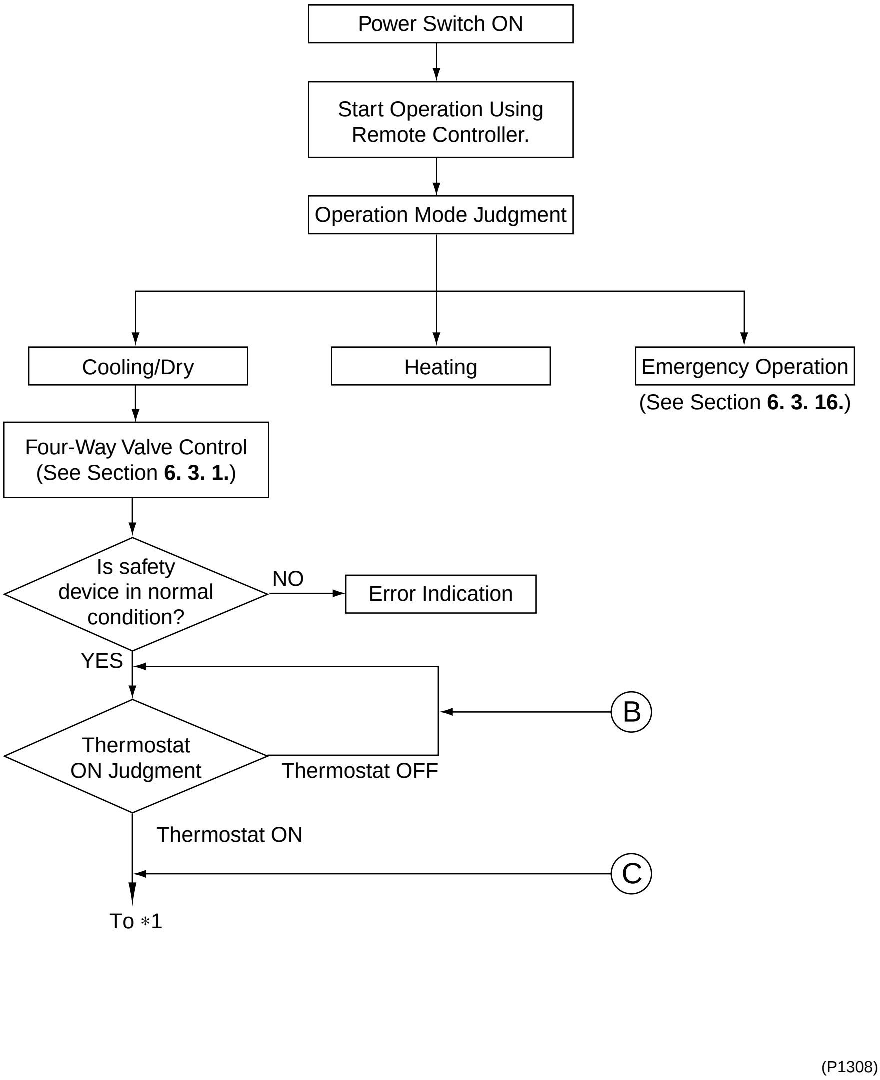


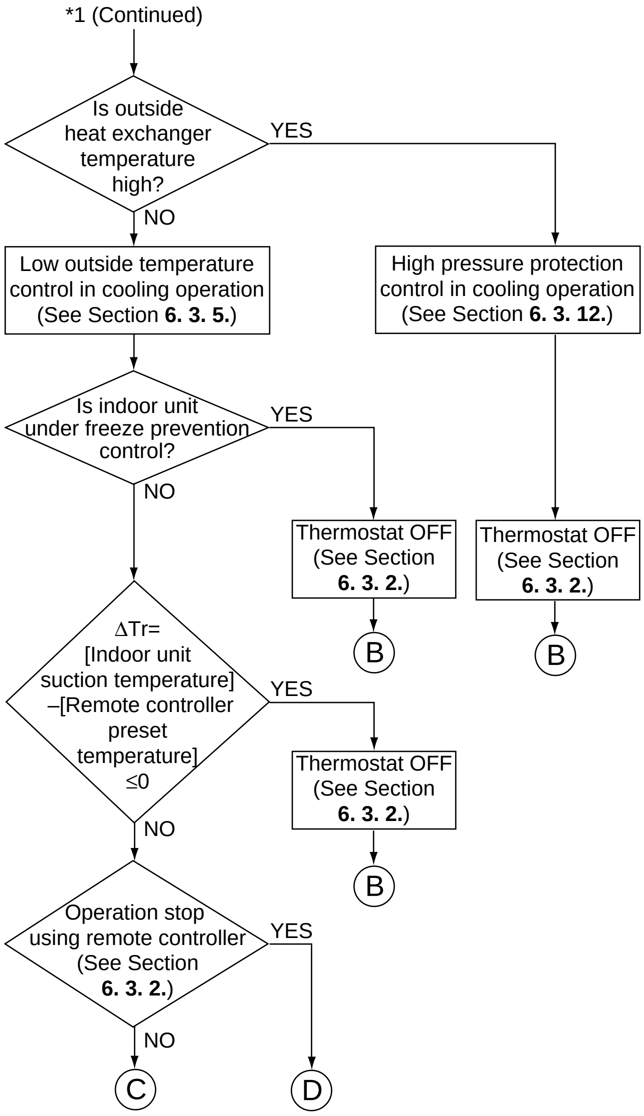
(P1307)

Note: For items indicated with reference section numbers 6.2.18 through 6.3.1, see the explanation of outdoor unit functions and operations on pages 194 through 197.

3. Operation Flowchart (RY200, 250KU)

3.1 Cooling / Program Dry Operation

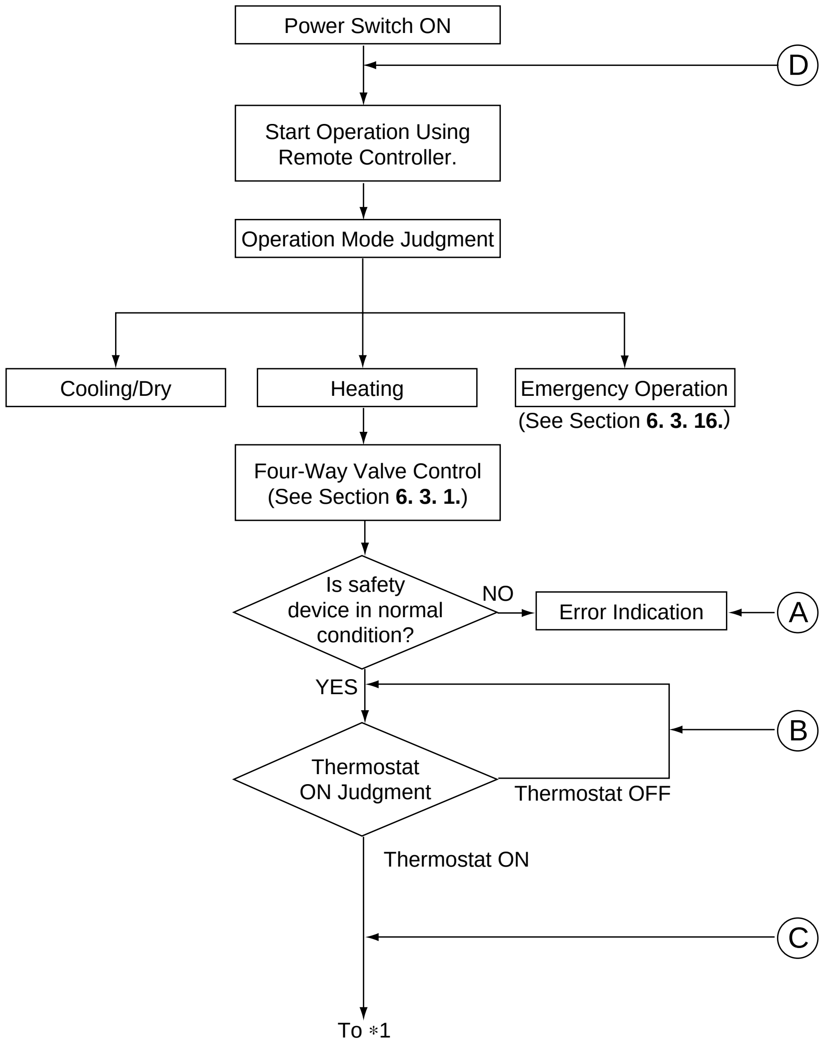




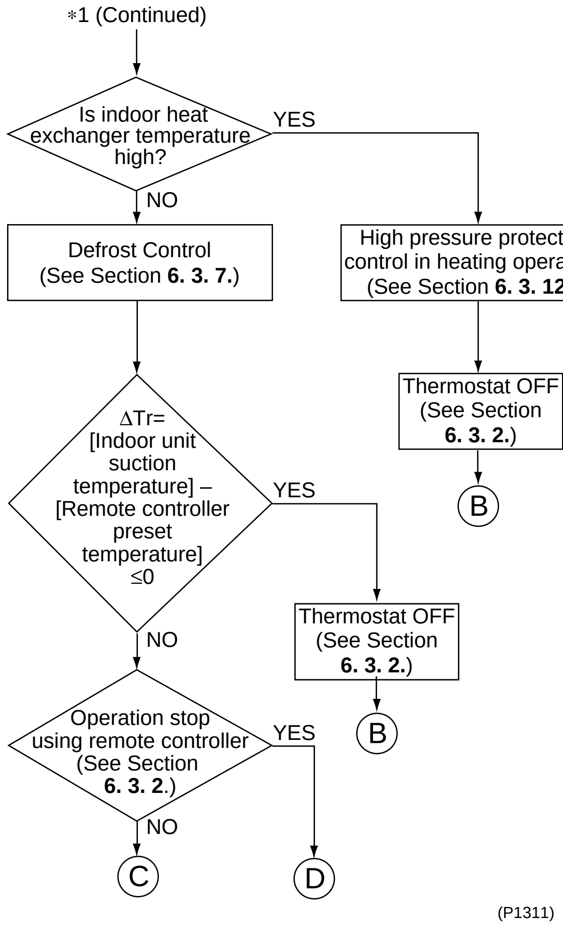
(P1309)

Note: For items indicated with reference section numbers 6.3.1 through 6.3.16, see the explanation of **outdoor unit** functions detail on pages 197 through 203.

3.2 Heating



(P1310)



Note: For items indicated with reference section numbers 6.3.1 through 6.3.16, see the explanation of outdoor unit functions and operations on pages 197 through 203.

4. Electric Function Parts

4.1 Indoor Unit

FDY-KY1

Capacity	FDY06KY1	FDY08KY1	FDY10KY1
Remote Controller	BRC1C51		
Printed Circuit Board (control)	EC0083 [1P043357-3]		
Printed Circuit Board (Power Unit)	EC9438 [3PA58241-1]		
Fan Motor	IK 3ph 400V 4P 0.75kW	IK 3ph 400V 4P 1.5kW	
Fan Motor Magnetic Switch	CLK-15JTH40-P6A 220V		
Fan Motor Over Current Relay	1.5A	3.6A	

Capacity	FDY15KY1	FDY20KY1
Remote Controller	BRC1C61	
Printed Circuit Board (control)	EC0083 [1P043357-3] × 2	
Printed Circuit Board (Power Unit)	EC9438 [3PA58241-1] × 2	
Fan Motor	TFO 3ph 400V 4P 2.2kW	TFO 3ph 400V 4P 3.7kW
Fan Motor Magnetic Switch	CLK-15JTH40-P6 220V	CLK-15JTH40-P6 220V
Fan Motor Over Current Relay	4.6A	6.7A

FDY-KYAL

Capacity	FDY08KYAL	FDY10KYAL
Remote Controller	BRC1C51	
Printed Circuit Board (control)	EC0083 [1P043357-3]	
Printed Circuit Board (Power Unit)	EC9438 [3PA58241-1]	
Fan Motor	IK 3ph 400V 4P 1.5kW	
Fan Motor Magnetic Switch	CLK-15JTH40-P6A 220V	
Fan Motor Over Current Relay	3.2A	

Capacity	FDY15KYAL	FDY20KYAL
Remote Controller	BRC1C61	
Printed Circuit Board (control)	EC0083 [1P043357-3] × 2	
Printed Circuit Board (Power Unit)	EC9438 [3PA58241-1] × 2	
Fan Motor	TFO 3ph 400V 4P 2.2kW	TFO 3ph 400V 4P 3.7kW
Fan Motor Magnetic Switch	CLK-15JTH40-P6 220V	CLK-15JTH40-P6 220V
Fan Motor Over Current Relay	4.6A	6.7A

FDY-KTAL

Capacity	FDY08KTAL	FDY10KTAL
Remote Controller	BRC1C51	
Printed Circuit Board (control)	EC0083 [1P043357-3]	
Printed Circuit Board (Power Unit)	EC9438 [3PA58241-1]	
Fan Motor	IK 3ph 220V 4P 1.5kW	
Fan Motor Magnetic Switch	CLK-15JTH40-P6A 220V	
Fan Motor Over Current Relay	6.0A	

Capacity	FDY15KTAL	FDY20KTAL
Remote Controller	BRC1C61	
Printed Circuit Board (control)	EC0083 [1P043357-3] × 2	
Printed Circuit Board (Power Unit)	EC9438 [3PA58241-1] × 2	
Fan Motor	TFO 3ph 220V 4P 2.2kW	TFO 3ph 220V 4P 3.7kW
Fan Motor Magnetic Switch	CLK-15JTH40-P6a 220V	HOE-20F-TCH1B 220V
Fan Motor Over Current Relay	9.2A	14.0A

FDY-KAY1

Capacity	FDY06KAY1	FDY08KAY1	FDY10KAY1
Remote Controller	Wired BRC1C61, Wireless BRC4C62		
Printed Circuit Board (control)	EC0103 [2P073194-1]		
Printed Circuit Board (Power Unit)	EC9438 [3PA58241-1]		
Fan Motor	IK 3ph 400V 4P 0.75kW	IK 3ph 400V 4P 1.5kW	
Fan Motor Magnetic Switch	CLK-15JTH40-P6A 220V		
Fan Motor Over Current Relay	1.5A	3.6A	

Capacity	FDY15KAY1	FDY20KAY1
Remote Controller	Wired BRC1C61, Wireless BRC4C62	
Printed Circuit Board (control)	EC0083 [1P043357-3] × 2	
Printed Circuit Board (Power Unit)	EC9438 [3PA58241-1] × 2	
Fan Motor	TFO 3ph 400V 4P 2.2kW	TFO 3ph 400V 4P 3.7kW
Fan Motor Magnetic Switch	CLK-15JTH40-P6 220V	CLK-15JTH40-P6 220V
Fan Motor Over Current Relay	4.6A	6.7A

FDY-KAYAL

Capacity	FDY08KAYAL	FDY10KAYAL
Remote Controller	Wired BRC1C61, Wireless BRC4C62	
Printed Circuit Board (control)	EC0103 [2P073194-1]	
Printed Circuit Board (Power Unit)	EC9438 [3PA58241-1]	
Fan Motor	IK 3ph 400V 4P 1.5kW	
Fan Motor Magnetic Switch	CLK-15JTH40-P6A 220V	
Fan Motor Over Current Relay	3.2A	

Capacity	FDY15KAYAL	FDY20KAYAL
Remote Controller	Wired BRC1C61, Wireless BRC4C62	
Printed Circuit Board (control)	EC0083 [1P043357-3]×2	
Printed Circuit Board (Power Unit)	EC9438 [3PA58241-1]×2	
Fan Motor	TFO 3ph 400V 4P 2.2kW	TFO 3ph 400V 4P 3.7kW
Fan Motor Magnetic Switch	CLK-15JTH40-P6 220V	CLK-15JTH40-P6 220V
Fan Motor Over Current Relay	4.6A	6.7A

FDY-KATAL

Capacity	FDY08KATAL	FDY10KATAL
Remote Controller	Wired BRC1C61, Wireless BRC4C62	
Printed Circuit Board (control)	EC0103 [2P073194-1]	
Printed Circuit Board (Power Unit)	EC9438 [3PA58241-1]	
Fan Motor	IK 3ph 220V 4P 1.5kW	
Fan Motor Magnetic Switch	CLK-15JTH40-P6A 220V	
Fan Motor Over Current Relay	6.0A	

Capacity	FDY15KATAL	FDY20KATAL
Remote Controller	BRC1C61	
Printed Circuit Board (control)	EC0083 [1P043357-3]×2	
Printed Circuit Board (Power Unit)	EC9438 [3PA58241-1]×2	
Fan Motor	TFO 3ph 220V 4P 2.2kW	TFO 3ph 220V 4P 3.7kW
Fan Motor Magnetic Switch	CLK-15JTH40-P6a 220V	HOE-20F-TRH1 220V
Fan Motor Over Current Relay	9.2A	14.0A

4.2 Outdoor Unit

RY

		RY140KUY1
M1C	Compressor	JT170BC-YE
J1HC	Crank Case Heater	33W
S1PH	Pressure Switch for High Pressure Protection	ACB-DB82 OFF : 30^{+0}_{-1}(kg/cm²G) ON : 22±1.5(kg/cm²G)
S2PH	Pressure Switch for High Pressure Control	ACB-JBJ8
S1LP	Pressure Switch for Low Pressure Control	LCB-JA62 OFF : 0.03±0.02MPa ON : 0.05±0.03MPa
K1M	Magnetic Switch	HOE-26F-TRA1
F1C	Overcurrent Relay	15A
M1F	Outdoor Unit Fan (Upper)	90W
M2F	Outdoor Unit Fan (Lower)	80W
Q1L Q2L	Outdoor Unit Fan Motor Safety Thermostat	OFF : 135±5°C ON : Below 120°C
C1R	Capacitor for M1F	8μF
C2R	Capacitor for M2F	6μF
A1P	Outdoor Unit Control PC Board	EC9922
A2P	Outdoor Control PC Board (Models for the FJ Type Only)	EC9546
R1T	Thermistor (for Outdoor Air)	ST9303
R2T	Thermistor (for Heat Exchanger)	ST8604A
R3T	Thermistor (for Discharge pipe)	ST9701
T1R	Transformer	TR21H16R2
Y1R	4-way Changeover Valve	CHV-0401

		RY200KUY1	RY200KUTAL	RY200KUYAL
M1C	Compressor	JT236-P1YE	JT212D-P1	JT212D-P1YH
J1HC	Crank Case Heater	50W 240V		
S1PH	Pressure Switch for Maintaining High Pressure	ACB-JBK6 OFF: $2.94^{+0}_{-0.1}$MPa ON : 2.16±0.16 MPa		
S2PH	Pressure Switch for High pressure control	ACBJBJ8 OFF : 2.35±0.1 MPa ON : 1.67±0.1 MPa		
S1LP	Pressure Switch for Low Pressure Control	LCB-JA81 OFF: -0.03±0.02 MPa ON :0.05±0.03 MPa		
K1M	Magnetic Switch	HOE-35F-TRH1D	HOE-35F-TRH1D	HOE-35F-TRH1D
F1C	Overcurrent Relay	18A	33A	18A
M1F	Outdoor Unit Fan (Upper)	230W		
M2F	Outdoor Unit Fan (Lower)	190W		
Q1L Q2L	Outdoor Unit Fan Motor Safety Thermostat	OFF : 135±5°C ON : Below 120°C		
C1R	Capacitor for M1F	12μF		
C2R	Capacitor for M2F	12μF		
A1P	Outdoor Unit Control PC Board∗	EC0016		
A2P	Outdoor Control PC Board	EC9546	—	EC9546
R1T	Thermistor (for Outdoor Air)	ST8603		
R2T	Thermistor (for Heat Exchanger)	ST8604A		
T1R	Transformer	TR21H16R2	TR21M16R2	TR21H16R2
Y1R	4-way Valve (Body)	VH60100		
	4-way Valve (Coil)	LCB62010 AC220-240V	LCB62006 AC200V	

		RY250KUY1	RY250KUYAL	RY250KUTAL
M1C	Compressor	JT3350D-P1YE	JT300D-P1	JT300D-P1YH
J1HC	Crank Case Heater	72W 240V		
S1PH	Pressure Switch for Protection High Pressure	ACB-JBK6 OFF: $2.94^{+0}_{-0.1}$MPa ON : 2.16±0.16 MPa		
S2PH	Pressure Switch for High pressure control	ACBJBJ8 OFF : 2.35±0.1 MPa ON : 1.67±0.1 MPa		
S1LP	Pressure Switch for Low Pressure Protection	LCB-JA81 OFF: -0.03±0.02 MPa ON : 0.05±0.03 MPa		
K1M	Magnetic Switch	CLK-50JTH-P12		
F1C	Overcurrent Relay	24A	24A	46A
M1F	Outdoor Unit Fan (Upper)	230W		
M2F	Outdoor Unit Fan (Lower)	190W		
Q1L Q2L	Outdoor Unit Fan Motor Safety Thermostat	OFF : 135±5°C ON : Below 120°C		
C1R	Capacitor for M1F	12μF		
C2R	Capacitor for M2F	12μF		
A1P	Outdoor Unit Control PC Board*	EC0016		
A2P	Outdoor Control PC Board	EC9546		
R1T	Thermistor (for Outdoor Air)	ST8603		
R2T	Thermistor (for Heat Exchanger)	ST8604A		
T1R	Transformer	TR04H15R5-1		
Y1R	4-way Valve (Body)	VH60100		
	4-way Valve (Coil)	LCB62010 AC220-240V	LCB62006 AC200V	

5. Thermistor Temperature and Resistance Conversion Table

5.1 Thermistor Temperature and Resistance Conversion Table

5.1.1 Table for 1

Temperature (°C)	Suction, Remote controller, Heat Exchange (Indoor Unit), Outdoor Air, Outdoor Suction Pipe, Sensor (kΩ)	Temperature (°C)	Suction, Remote controller, Heat Exchange (Indoor Unit), Outdoor Air, Outdoor Suction Pipe, Sensor (kΩ)	Temperature (°C)	Suction, Remote controller, Heat Exchange (Indoor Unit), Outdoor Air, Outdoor Suction Pipe, Sensor (kΩ)
-6.0	90.8	16.0	30.2	38.0	11.5
-4.0	81.7	18.0	27.5	40.0	10.6
-2.0	73.5	20.0	25.1	42.0	9.8
0.0	66.3	22.0	23.0	44.0	9.1
2.0	59.8	24.0	21.0	46.0	8.4
4.0	54.1	26.0	19.2	48.0	7.8
6.0	48.9	28.0	17.6	50.0	7.2
8.0	44.3	30.0	16.2	52.0	6.9
10.0	40.2	32.0	14.8	54.0	6.2
12.0	36.5	34.0	13.6	56.0	5.7
14.0	33.2	36.0	12.5	58.0	5.3

5.1.2 Table for 2

Temperature (°C)	Discharge Pipe Sensor (kΩ)	Temperature (°C)	Discharge Pipe Sensor (kΩ)	Temperature (°C)	Discharge Pipe Sensor (kΩ)	Temperature (°C)	Discharge Pipe Sensor (kΩ)
-6.0	1120.0	40.0	118.7	94.0	15.8	140.0	4.1
-4.0	1002.5	42.0	109.0	96.0	14.8	142.0	3.9
-2.0	898.6	44.0	100.2	98.0	13.9	144.0	3.7
0.0	806.5	46.0	92.2	100.0	13.1	146.0	3.5
2.0	724.8	48.0	84.9	102.0	12.3	148.0	3.3
4.0	652.2	50.0	78.3	104.0	11.5	150.0	3.2
6.0	587.6	52.0	72.2	106.0	10.8	152.0	3.0
8.0	530.1	54.0	66.7	108.0	10.2	154.0	2.9
10.0	478.8	56.0	61.6	110.0	9.6	156.0	2.7
12.0	432.9	58.0	57.0	112.0	9.0	158.0	2.6
14.0	392.0	60.0	52.8	114.0	8.5	160.0	2.5
16.0	355.3	62.0	48.9	116.0	8.0	162.0	2.3
18.0	322.4	64.0	45.3	118.0	7.6	164.0	2.5
20.0	292.9	66.0	42.0	120.0	7.1	166.0	2.1
22.0	266.3	68.0	39.0	122.0	6.7	168.0	2.0
24.0	242.5	70.0	36.3	124.0	6.4	170.0	1.9
26.0	221.0	72.0	33.7	126.0	6.0	172.0	1.9
28.0	201.6	74.0	31.4	128.0	5.7	174.0	1.8
30.0	184.1	76.0	29.2	130.0	5.4	176.0	1.7
32.0	168.3	78.0	27.2	132.0	5.4	178.0	1.6
34.0	154.0	80.0	25.4	134.0	4.8	180.0	1.5
36.0	141.0	82.0	23.7	136.0	4.6		
38.0	129.3	92.0	16.9	138.0	4.3		

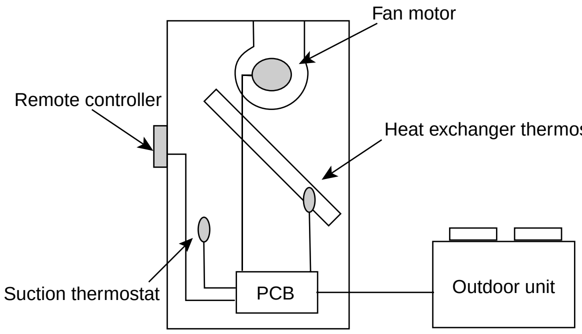
6. Function Details

6.1 Indoor Unit FDY06~20K(A) Functional Specifications

6.1.1 System Configuration Figure

- **The basic system configurations consist of two system setups as below: One-system setup of a 5 to 10HP unit and Two-system setup of a 15 and 20HP unit as below.**

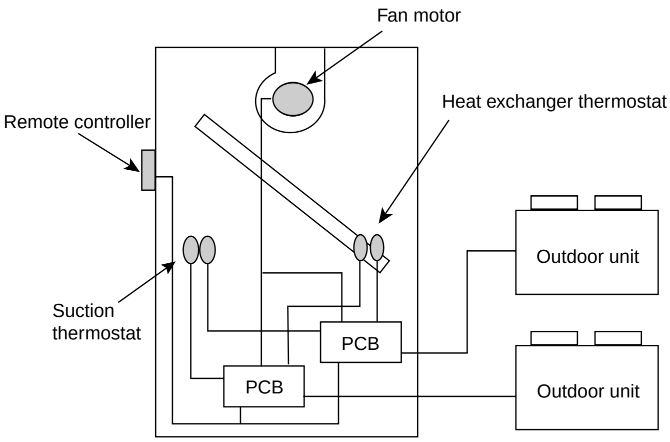
5 to10HP Chillers



(P1312)

15,20HP Chillers

- One each of suction and heat exchanger thermistor is equipped with each system.
- Indoor unit fan is operated via OR circuit of the fan output in a two-system setup. When the fan is OFF for both systems, the fan operation is OFF.
- The transmission between PCB of both systems is conducted via the remote controller.



(P1313)

- **Group control**

Group control can be conducted with a 5 to10HP unit (one-system setup).
A 15 and 20HP unit (two-system setup) is not applicable to the group control.

6.1.2 Temperature Setting with Remote Controller

Temperature setting range with remote controller

Setting position number		01 (in standard condition)
Temperature setting range	Cooling	18 - 35°C
	Heating	15 - 30°C

6.1.3 Temperature Control in Cooling and Heating Operation

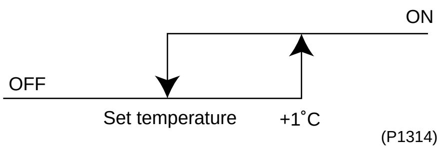
- **Conduct the temperature control on each model in the following manner.**
- Indoor unit sends to outdoor unit side the data for a temperature difference (ΔT) between the set temperature and current temperature. The content of the data is as follows.

In suction temperature control
ΔT = Suction temperature - Set temperature

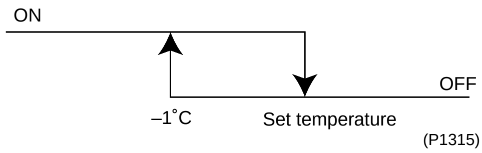
- When the outdoor unit receives the ΔT data, it performs the following operation control.

5 to 10HP Units

Cooling

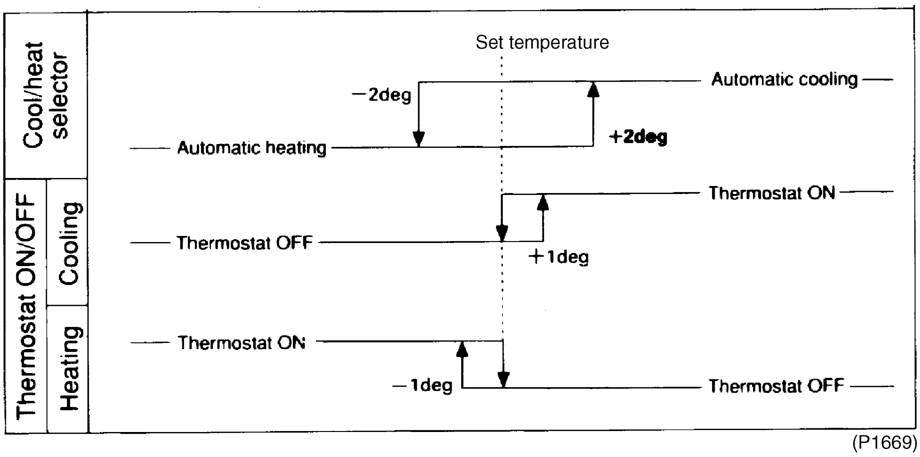


Heating



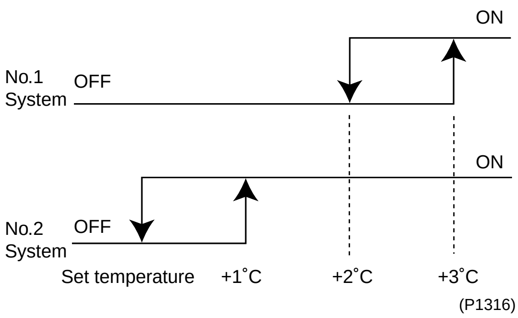
5 to 10HP Units (FDY-KA model only)

Automatic Cool / Heat Change Over

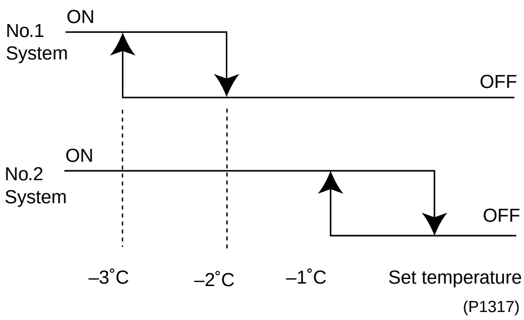


15 to 20HP Units (Two-system unit)

Cooling



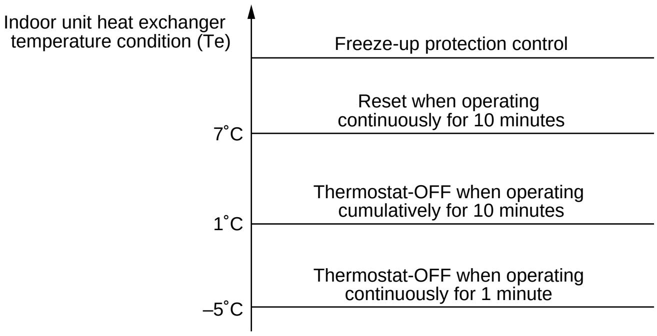
Heating



A 15, 20HP chiller (two-system setup) performs capacity control when a value added 2°C on ΔT of any one system is sent to the outdoor unit side.

6.1.4 Freeze-up Protection Control

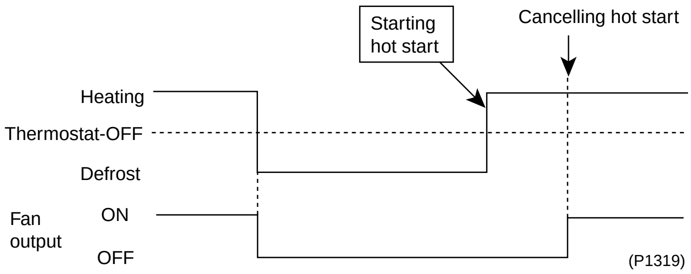
In cooling operation, the compressor forcibly stops when it operates cumulatively for 10 minutes at the indoor unit heat exchanger temperature of 1°C or lower, or continuously for 1 minute at that of -5°C or lower after operating continuously for 8 minutes.
The freeze-up protection can be reset only after the compressor operates continuously for 10 minutes at 7°C or higher.



(P1318)

6.1.5 Defrost Control

■ **Conduct defrosting operation on each model in the following manner.**
■ For 5 to 10HP chillers



(P1319)

The fan stops operating in the defrost operation for cold air protection. The fan restarts with the hot start mode when the defrost operation is reset.
∗The fan operates in the normal thermostat-OFF status.

■ For 15, 20HP chillers (Two-system machine)
Basically, two systems can start defrost operation independently regardless of the respective operating status of other systems.
The fan operating status will be as follows.

Fan operation in different operating status

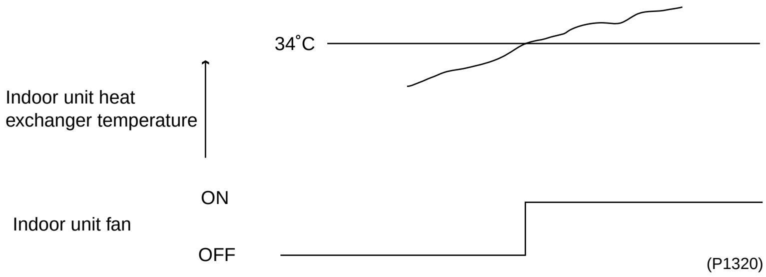
No.1 system / No.2 system	Heating	Thermostat-OFF	Defrost
Heating	ON	ON	ON
Thermostat-OFF	ON	ON	OFF∗
Defrosting	ON	OFF∗	OFF

∗In normal thermostat-OFF operation, the fan runs. When another system is in defrosting operation, however, the fan stops running for the cold air protection.

■ **Hot start**
After the defrosting operation completes, the hot start is cancelled when the indoor unit heat exchanger temperature reaches to 34°C or higher.

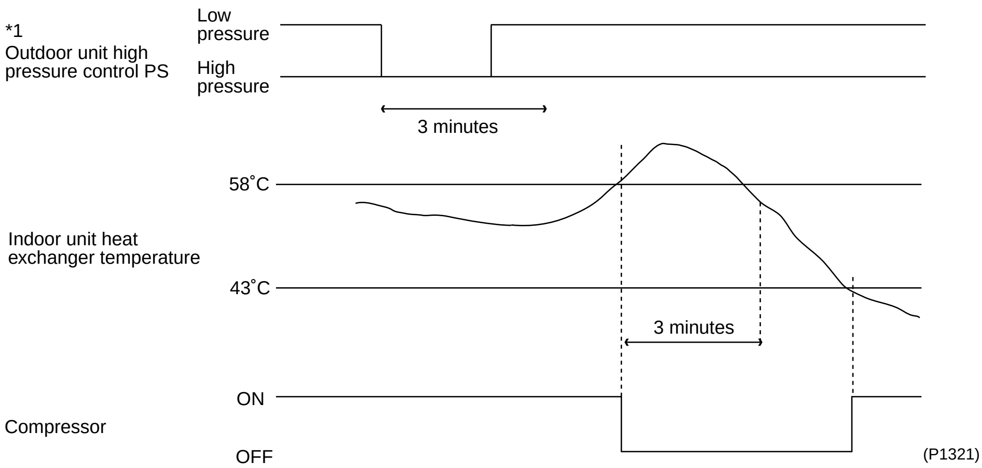
6.1.6 Cold Air Protection Function

In heating operation, the indoor unit fan can run only when the indoor unit heat exchanger temperature reaches to 34°C or higher or 1 minute elapses after the compressor turns ON.



6.1.7 Heating Overload Control

In heating operation, the compressor forcibly stops when 3 minutes elapse and the indoor unit heat exchanger temperature reaches 58°C or higher after a high pressure control PS of the outdoor unit is activated. The compressor is reset when the indoor unit heat exchanger temperature comes down to 43°C or lower.



6.1.8 Group Control

Perform the local settings for group control mode.

Mode No.	Setting Switch No.	Setting Position No.	
14	9	01	Not group control (factory setting)
		02	Group control

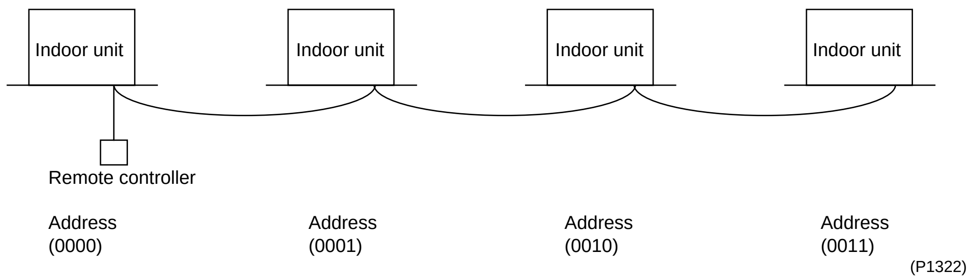
Note that the group control setting is not allowed on 15 to 20HP chillers.

Master and slave units of two-system setup

Either one system of the two systems is automatically determined as the master unit, and another one as the slave unit.

Group No. Control by A Single Remote Controller

Up to 16 indoor units can be controlled by using a single remote controller.
The commands (i.e. flap and microcomputer dry) from remote controller received by indoor unit will be ignored when the indoor unit does not have the function for the commands.



6.1.9 Filter Sign

Filter sign is indicated on the remote controller when the operation time reaches to preset value based on cumulated operation time.

Setting time

Filter Setting	Normal type	Long life type
Soiled heavily	100 hr	1100 hr
Soiled slightly	200 hr	2500 hr

Setting value can be changed with remote controller.

6.1.10 Demand Control

■ Each model is equipped with the following demand input application.

Indoor unit	NON outdoor unit
5HP	Provide an adapter used for the remote group control on the indoor unit side to conduct the thermostat-OFF operation (fan operation) through the external input.
7.5 to 10HP	
15 to 20HP	

6.1.11 Resetting Abnormality

■ When detecting abnormality in operation, the following will be conducted.

5 to 10HP units

When abnormality occurs, the following will be conducted.

1. Thermostat-OFF (The fan keeps running.)
2. Malfunction code displayed on the screen of remote controller

15, 20HP units

When one system abnormality occurs, the following will be conducted.

1. Thermostat-OFF in the system generating abnormality (The fan keeps running.)
2. Forced thermostat-OFF in the system generating no abnormality
3. Malfunction code displayed on the screen of remote controller

■ When one system abnormality occurs on a 15, 20HP unit (two-system machine), conduct local settings in the following procedure through the control panel enabling operation only on normal system.

◆ Procedure

1. Press a “ON/OFF” button on the remote controller to stop operation.
2. Select the local setting “Perform group control” in the table below.
   (See the installation manual, etc. for Local Settings.)
3. Press the “ON/OFF” button on the remote controller to start operation

Mode No.	Setting Switch No.	Setting Position No.	
14	9	01 Not group control (factory setting)	02 →Group control

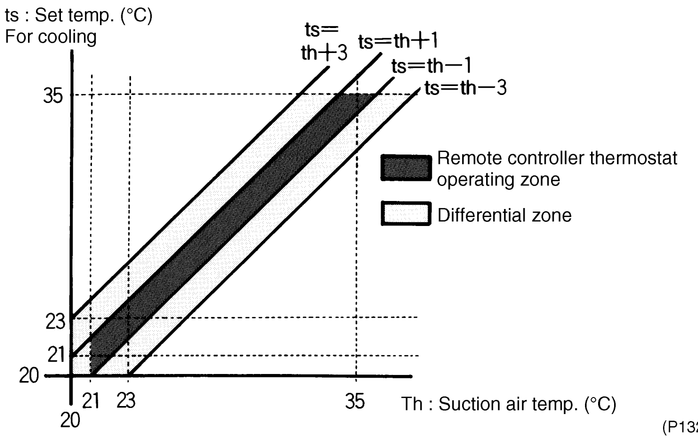
This local setting allows only the normal system to run, but the screen of the remote controller keeps displaying the malfunction code of the abnormal system.

6.1.12 Using Conditions for Remote Controller Thermostat

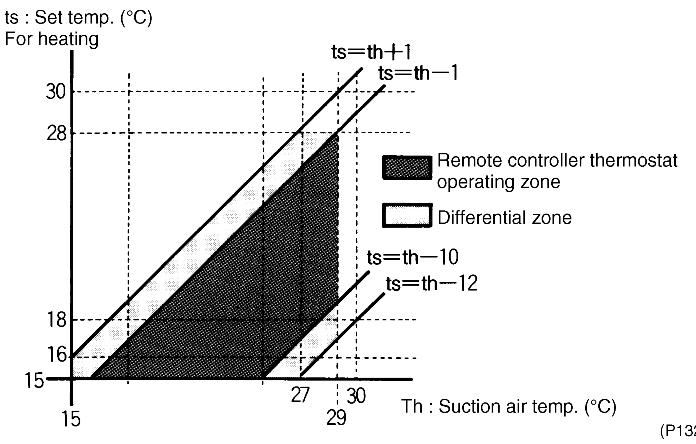
Remote controller thermostat is equipped only in wired remote controller.
Even when “ use remote controller thermostat ” is selected in service mode, the remote controller thermostat may not be used.

< Conditions not to use >

1. When the remote controller thermostat malfunctions.
2. When the one remote controller group control is applied.
   (Excluding simultaneous ON/OFF operation)
3. When conditions relating set temperature with remote controller and suction air temperature are out of the operating zone of remote controller thermostat shown in below diagram.
   (Excluding when automatic operation mode is selected. Whenever operation is in the automatic mode, remote controller thermostat can be used.)



(P1323)



(P1324)

6.1.13 Auto-restart Function

If there is a power cut when the unit is operating, it will automatically resume the same operating mode when the power is restored.

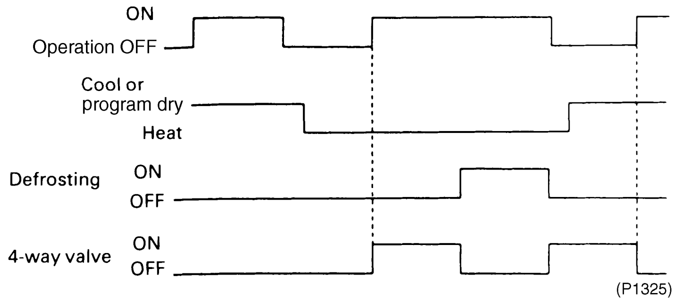
Caution When performing maintenance and the power supply is to be shut off, be sure to turn the remote controller’s ON/OFF switch OFF first.

Shutting the power supply switch off while the ON/OFF switch is still ON is dangerous because the “power failure automatic reset function” will cause the indoor fan to start turning immediately, or the outdoor unit fan to automatically start turning three minutes after the power supply is turned back on.

6.2 Outdoor Unit RY140KU Model

6.2.1 4-way Valve Control

4-way valves conduct power when heating. Changeover switching is carried out only during operation.
4-way valve ON : During heating except when defrosting
4-way valve OFF : During cooling, program dry and defrosting

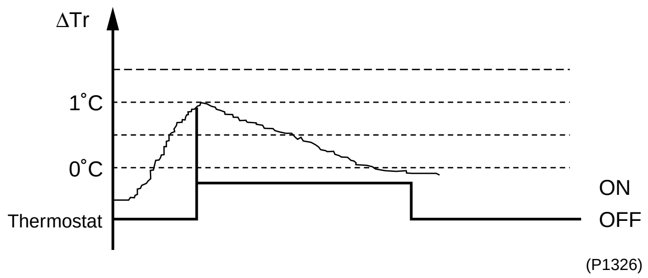


6.2.2 Operation, Stop and Thermostat Control

Thermostat Control

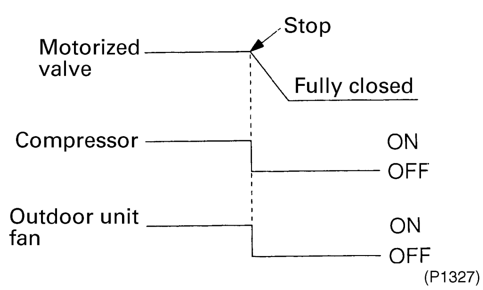
Basic thermostat ON/OFF operations.......
Thermostat turns ON when ΔTr is 1°C.
Thermostat turns OFF when ΔTr is 0°C.

During Defrosting or Forced operation
→ Room temperature control prevents thermostat from turning OFF.



∗ Regarding ΔTr
In cooling operation
ΔTr = Indoor unit suction air temperature (Tr) - Temperature set by remote controller
In heating operation
ΔTr = Temperature set by remote controller - Tr

Compressor Shutdown Operation



- When the thermostat is OFF due to the room temperature level, the compressor stops 5 seconds after the electronic expansion valve closes.
- When the operation stops by remote controller or the malfunction is finalized by protection devices, electronic expansion valve is closed further 8 pulses from fully closed position.

6.2.3 HPS / LPS Detection Function

If either HPS or LPS are actuated while the compressor is running, the compressor stops and begins standing by for 3 minutes. (Depending on operation conditions, even if LPS is actuated the compressor may not go OFF in some cases)
If this movement is detected an additional 6 times from the time it is first detected to until turned off by remote controller, operation is stopped due to malfunction.

6.2.4 Electronic Expansion Valve Control

Electronic Expansion Valve Initialize

About 10 seconds after turning on the power supply, the electronic expansion valve's opening is tightened 520 pulses to close it all the way.

Discharge Pipe Temperature

The optimal discharge pipe temperature for present operation is calculated according to indoor unit heat exchange temperature, outdoor unit heat exchange temperature, and outdoor air temperature, with the electronic expansion valve being controlled so that the discharge pipe temperature approaches the optimal discharge pipe temperature.

Optimal discharge pipe temperature - discharge pipe temperature <0°C (superheat operation)
→ Motor operated valve is opened

Optimal discharge pipe temperature - discharge pipe temperature >0°C (wet operation)
→ Motor operated valve is closed.

6.2.5 Abnormally High Discharge Pipe Temperature

If discharge pipe high temperature thermostat OFF or T2 (discharge pipe thermistor) disconnection is determined 6 times or wet operation protection control is determined, operation stops due to abnormal discharge pipe temperature.

Wet Operation Protection Control

Cooling : Discharge pipe temperature < outdoor unit heat exchanger temperature +10°C
15 minutes in succession
Heating : Discharge pipe temperature < indoor unit heat exchanger temperature +10°C
15 minutes in succession

6.2.6 Discharge Pipe High Temperature Thermostat OFF Control

If discharge pipe temperature T2 remains above 123.5°C for 100 seconds in succession, or above 140°C for 20 seconds in succession, the thermostat is turned OFF.

6.2.7 T2 Disconnection Thermostat OFF Control

If the discharge pipe thermistor is determined to be disconnected from the piping 5 minutes after the compressor starts, the thermostat is turned OFF.

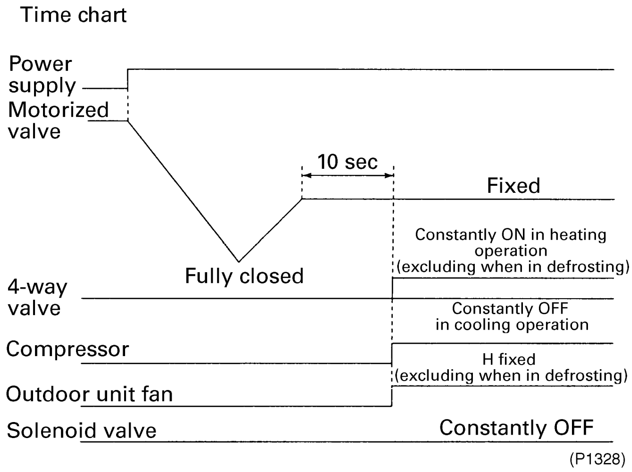
6.2.8 Lack of Gas Malfunction

When the thermostat is turned OFF due to abnormally high discharge pipe temperature, lack of gas malfunction occurs if the opening of the solenoid valve is 450 pulses or more. Operation however does not stop due to lack of gas. Lack of gas malfunction can be checked by remote controller inspection.

6.2.9 Emergency Operation

- No signal is transmitted between the indoor and outdoor units.
- Emergency operation is not possible if the control printed circuit board has a malfunction.
- Switches on the control printed circuit boards of both indoor and outdoor units are used for an emergency operation.
  The outdoor unit's control printed circuit board is used for the changeover of the cooling/heating mode.
- In heating operation, defrosting operation is activated once every hour.

Time Chart



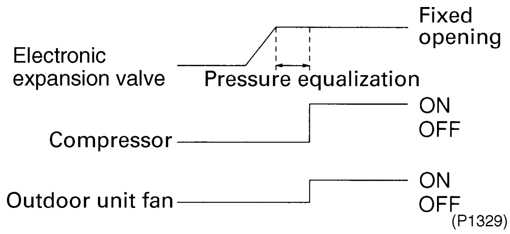
6.2.10 Simulated Operation Function

If the outdoor air thermistor and outdoor unit heat exchange thermistor are malfunctioning, simulated operation is carried out while malfunction is displayed on the remote controller. (Stops due to malfunction if the discharge pipe thermistor is defective.)

6.2.11 Cooling Start Control

The starting air flow volume is varied at a startup according to the outside air temperature (Ta) condition to prevent a rise in the high pressure and a drop in the low pressure.

Outside Air Temperature (Ta)	Air Flow Volume at Startup
Ta≤3°C	OFF at Startup
3°C≤Ta<10°C	L Air Flow Volume
10°C≤Ta<23°C	H Air Flow Volume
Ta>23°C	HH Air Flow Volume



∗1 : Opening of electronic expansion valve is fixed for up to 3 minutes.
∗2 : Units operate with the starting air flow volume for up to 3 minutes.

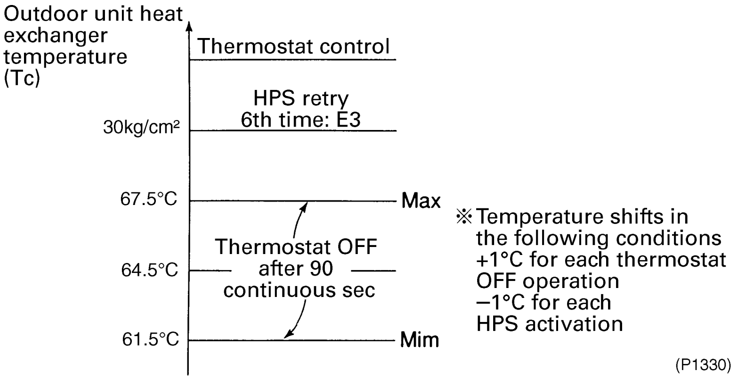
Outdoor Unit Fan Tap

Fan Tap	40~71	100~125	
	(1 Fan)	Upper Fan (MF1)	Lower Fan (MF2)
OFF	OFF	OFF	OFF
L	L	L	L
H	H	H	H
HH	HH	HH	HH

6.2.12 High Pressure Protection Control in Cooling Operation

- The thermostat turns OFF immediately before HPS activation according to the outdoor unit heat exchanger temperature (Tc) to prevent shutdown due to an error.

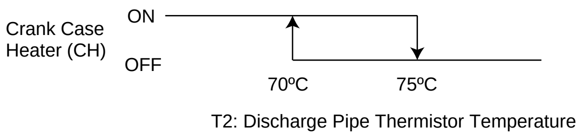
In the Case of RY



(P1330)

6.2.13 Standby Power Saving Control

- In order to save standby power consumption during operation stop and prevent refrigerant solution into compressor oil during crank case heater is turned OFF, the crank case heater is controlled based on discharge pipe temperature.



(P1331)

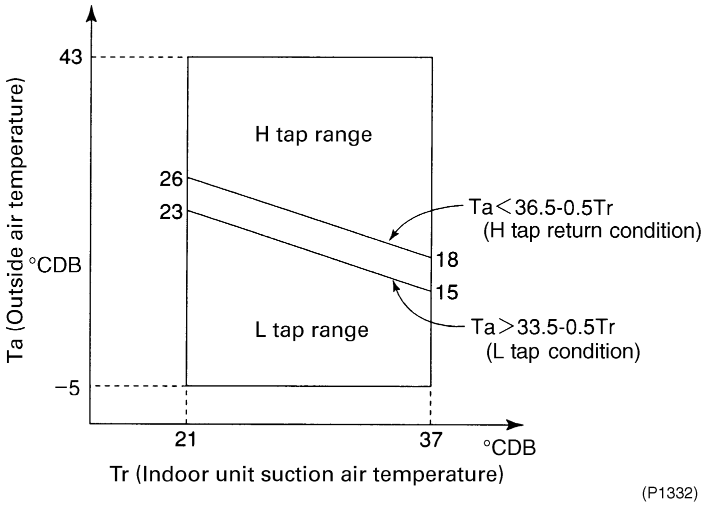
- When the power switch is turned on (including when power is turned off on remote controller), the crank case heater turns ON when T2 ≤ 70ºC.
- While the compressor is in operation, the crank case heater remains OFF.
- The following control activates when an abnormality occurs in the discharge pipe thermistor.
  Compressor in non-operation → Crank case heater ON
  Compressor in operation → Crank case heater OFF

6.2.14 Low Outside Temperature Control in Cooling Operation (Year-round Cooling)

The air flow volume of an outdoor unit fan is reduced to prevent freezing of the indoor unit heat exchangers due to a drop in the low pressure (LP) and indoor unit heat exchanger temperature (Te).

After starting control ends, if the outdoor air temperature falls below (33.5 - 0.5 × room suction temperature), the indoor unit fan speed is switched to “L.” The differential is 3°C.

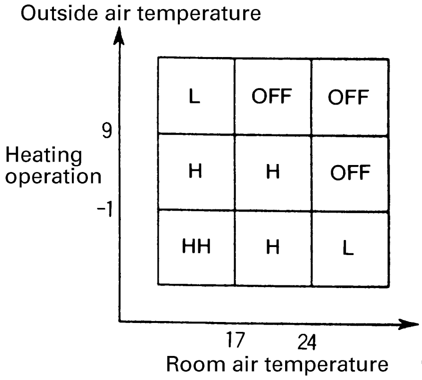
Fan Control



(P1332)

6.2.15 Fan Start Control in Heating Operation

The starting air flow volume is varied as shown below according to the outside air temperature condition.



(P1333)

Fan Tap	40~71	100~125	
	(1 Fan)	Upper Fan (MF1)	Lower Fan (MF2)
OFF	OFF	OFF	OFF
L	L	L	L
H	H	H	H
HH	HH	HH	HH

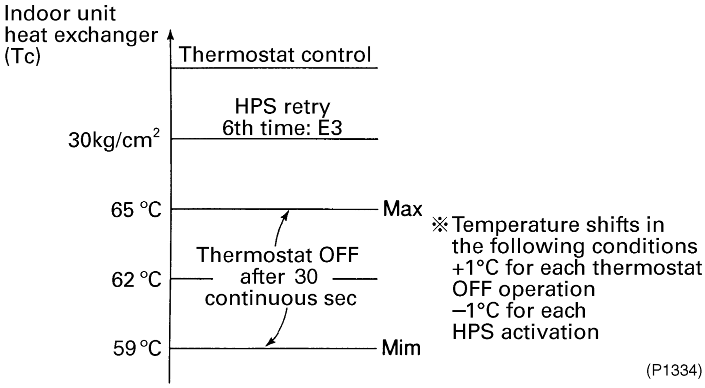
- Units operate with the starting air flow volume for up to 5 minutes.
- When the outside air temperature is 10°C or lower, the air flow volume stays at H for the first 5 seconds if it is switched from OFF to L.
  (Outdoor unit fan startup compensation control)

*LPS is not detected for 3 minutes after startup.

6.2.16 High Pressure Protection Control in Heating Operation

- The thermostat turns OFF immediately before HPS activation according to the indoor unit heat exchanger temperature (Tc) to prevent shutdown due to an abnormality.

In the Case of RY

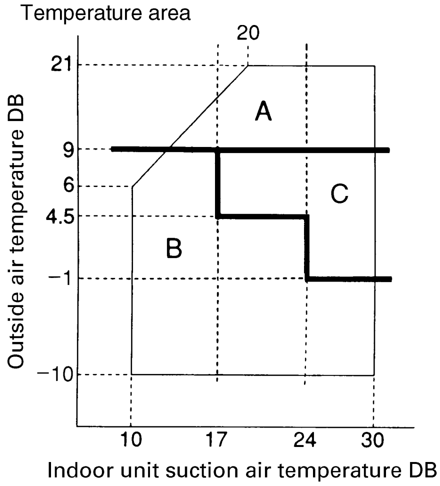


(P1334)

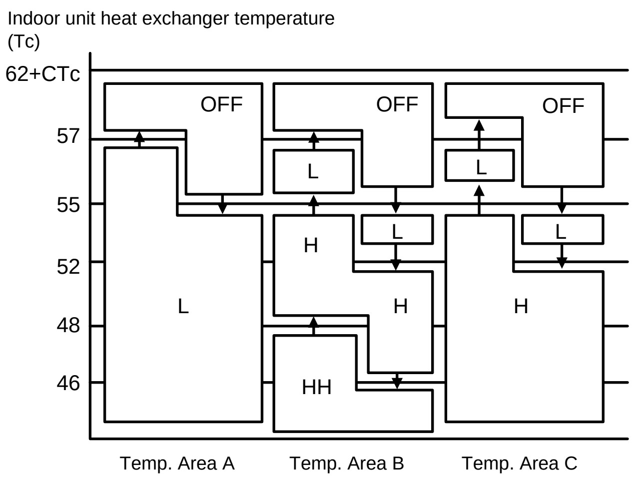
6.2.17 Outdoor Unit Fan Control (Heating Overload Frosting Prevention Control)

The air flow volume of an outdoor unit fan is varied in either one of the following three patterns according to the indoor unit heat exchanger temperature (Tc).

In the Case of RY



(P1335)



(P1336)

∗CTc : +3°C ~ –3°C

6.2.18 Defrosting

Defrost Starting Conditions

■ **Intelligent type**

Defrosting starts when either condition 1 or 2 has been realized.

◆ **Condition 1**

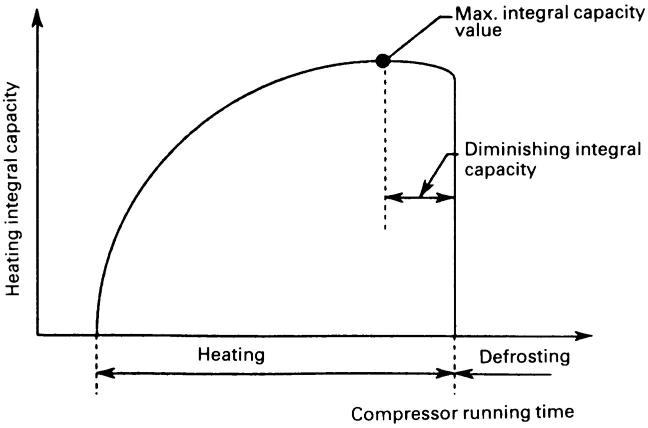
- The compressor has been running for a total of 25 minutes or more since the start of heating or since completion of previous defrosting.
- The compressor has been running continuously for 5 minutes or more.
- There is an overload but the outdoor unit fan is not OFF.
- Heating integral capacity is constant or diminishes (Notes 1), or integral operation hours is more than 3 hours (Note 2).
- Outdoor unit heat exchanger temperature < –3°C and outdoor unit heat exchanger temp. ≤ 0.4 × outdoor air temp. –5°C (Note 3).

◆ **Condition 2**

- The compressor has been running for a total of 30 minutes or more since the start of heating or since completion of previous defrosting.
- There is an overload but the outdoor unit fan is not OFF.
- Outdoor unit heat exchange temperature < –3°C and condition of outdoor unit heat exchanger temp. ≤ 0.4 × outdoor air temp. –5°C is continued more than 10 minutes.

Note:

1. Heating integral capacity
   Integral capacity is calculated by first totaled according to indoor unit data when heating, and then dividing it by the compressor running time.

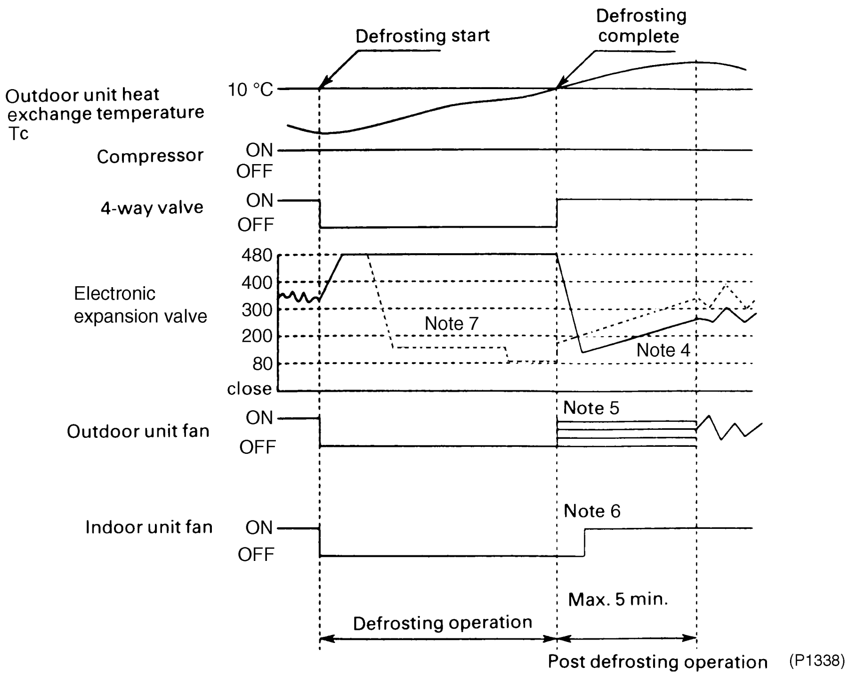


(P1337)

2. At the time of changeover switching, time can be changed 40 minutes or 24 hours.
3. At the time of changeover switching, defrosting start temperature becomes 4°C higher.

Control

During heating, a defrosting request is made by the indoor unit when defrosting conditions have been realized. The control method are as following.

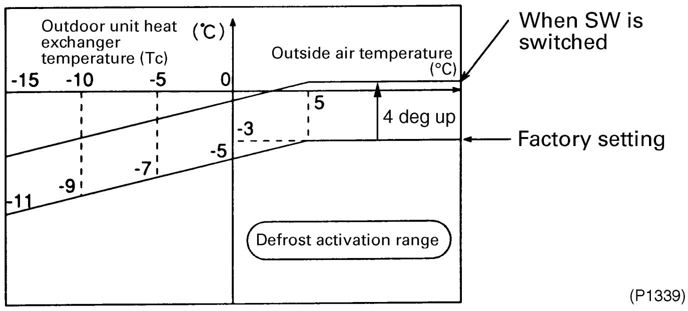


(P1338)

Note:

4. Defrosting completion for electronic expansion valve.
   Operated at best initial opening and opening speed according to operating conditions at the start of defrosting.
5. Defrosting completion for outdoor unit fan
   Operated at best fan tap according to operating conditions at the start of defrosting.
6. Indoor unit fan
   Hot start standby is carried out until 40 seconds elapses (20 seconds elapses in case of outdoor air temp. > 9°C and indoor air temp. > 24°C) from the time defrosting ends, or until the indoor unit heat exchange temperature rises.
7. Electronic expansion valve operation during defrosting.
   Once electronic expansion valve is opened fully, then it is adjusted optimum opening in accordance with discharge pipe temperature during defrosting.
   ◆In case of low discharge pipe temp. : Electronic expansion valve closes slightly.
   ◆In case of high discharge pipe temp. : Electronic expansion valve opens fully.

■ **Temperature conditions setting**



(P1339)

★Refer P.161 for detail setting.

■ **Defrost complete condition**

Defrost operation continues up to 10 minutes.
And if one of the following conditions is met after defrosting function has been operating for one minute or longer, the defrosting operation stops.

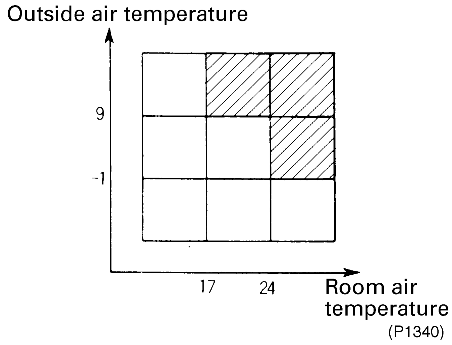
Outdoor unit heat exchanger temperature ≥ 10°C
Discharge pipe temperature > 120°C

■ Hot start after defrosting operation

Fan Stop

<After defrost completion>

<table>
<tr><td rowspan="4">OR</td><td rowspan="2">&</td><td>40 sec after defrost completion</td></tr>
<tr><td>20 sec after defrost completion in case ambient temp. > 9°C and indoor suction air temp. > 24°C</td></tr>
<tr><td rowspan="2">&</td><td>Before heat exchanger temp. > 36°C</td></tr>
<tr><td>Heat exchanger temp. > 18°C in case of shaded area.</td></tr>
</table>



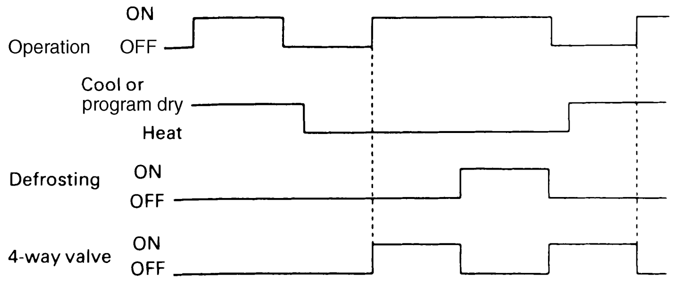
6.3 Outdoor Unit RY200·250KU Models

6.3.1 4-way Valve Control

4-way valves conduct power when heating. Changeover switching is carried out only during operation.

4-way valve ON : During heating except when defrosting

4-way valve OFF : During cooling, program dry and defrosting



(P1341)

6.3.2 Operation, Stop and Thermostat Control

Thermostat Control

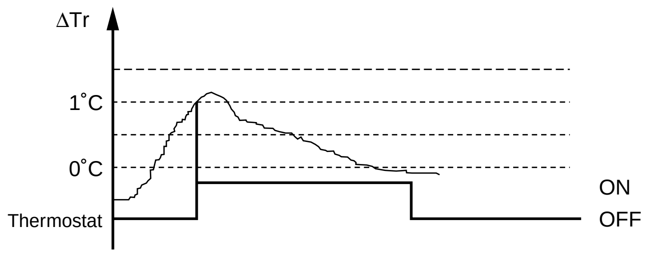
Basic thermostat ON/OFF operations.......

Thermostat turns ON when ΔTr is 1°C.

Thermostat turns OFF when ΔTr is 0°C.

During Defrosting or Forced operation

→ Room temperature control prevents thermostat from turning OFF.



(P1342)

∗ Regarding ΔTr

In cooling operation

ΔTr = Indoor unit suction air temperature (Tr) - Temperature set by remote controller

In heating operation

ΔTr = Temperature set by remote controller - Tr

6.3.3 3-Minute Standby Function

For 3 minutes from compressor OFF, a restart is prohibited, even if the thermostat ON conditions are met.

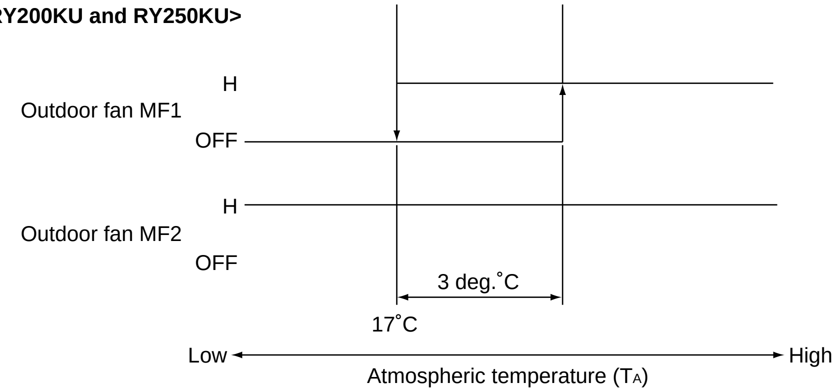
6.3.4 Compressor OFF Control

1. Freeze prevention signal
   When the compressor is operating due to Cooling or Dry signal sent from an indoor unit, transmission of a freeze prevention signal from any of the indoor units in the system turns OFF the compressor even if a ΔT signal, which is a compressor ON condition, is being received.
   The compressor remains OFF until the Freeze prevention signal is canceled.
2. Heating high pressure signal
   When the compressor is operating due to a Heating signal sent from an indoor unit, transmission of a Heating high pressure signal from any of the indoor units in the system turns OFF the compressor even if a ΔT signal, which is a compressor ON condition, is being received.
   The compressor remains OFF until the Heating high pressure signal is canceled.

6.3.5 Year Round Cooling Control

(Available with both cooling only model and heat pump model)
When the atmospheric temperature falls below 17°C during thermostat ON of a cooling or "program dry" operation, the following occur :
One fan is turned OFF, and the other stays at the H air quantity.

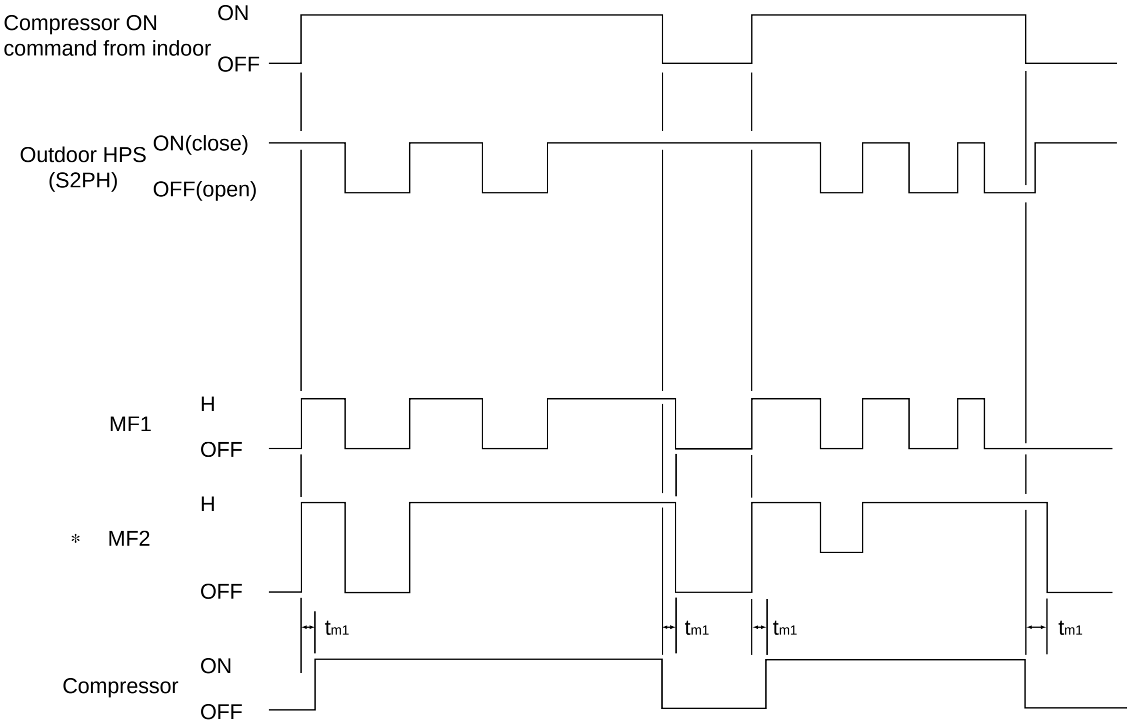
<RY200KU and RY250KU>



(P1343)

6.3.6 Overload Control Under High Outdoor Temperature During Heating Operation

(Available with heat pump model only)
The outdoor fan is controlled by ON / OFF of the outdoor HPS (S2PH) during thermostat ON of heating mode, as shown below. Note, however, this control is not provided during defrosting.



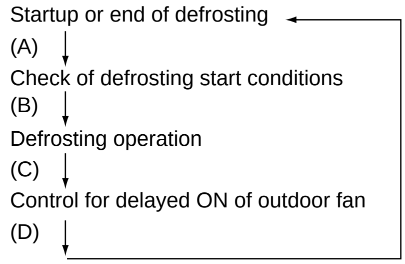
(P1344)

Note: The fan is turned OFF only with the first OFF of HPS after a startup, and from the second OFF onwards, the fan is switched to the H air quantity (this applies to fan MF2 only.)
T_m : Delayed ON of compressor and delayed OFF of outdoor fan (t_{m1}=2 seconds)

6.3.7 Defrosting Function

(Available with heat pump model only)

A defrosting operation occurs as shown in the following order (function in the heating mode):



(P1345)

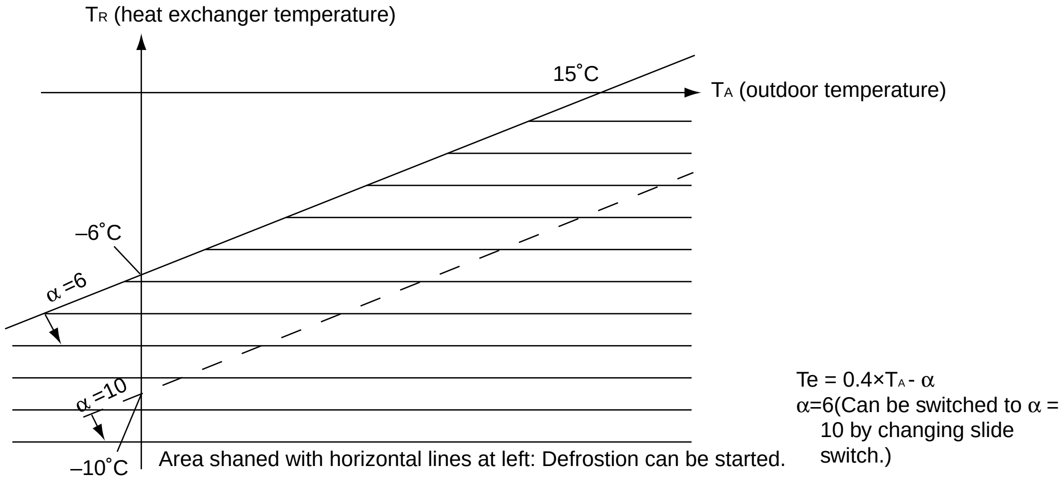
(A) Prohibition of Defrosting

While the total compressor ON time after the start of a heating mode or the end of defrosting is 40 minutes, no check for defrosting start conditions should be made.

(B) Check for defrosting start conditions

At the end of defrost prohibition time (40 minutes), check whether the following conditions hold or not:

<table>
<tr><td rowspan="6">&</td><td rowspan="3">OR</td><td rowspan="2">&</td><td>Integral operation hour is more than 3 hours
(*Can be switched to 1 hour by changing slide switch)</td></tr>
<tr><td>Thermostat ON for more than 20 sec.</td></tr>
<tr><td colspan="2">Thermostat ON for continuous 5 min.</td></tr>
<tr><td rowspan="2">OR</td><td colspan="2">Outdoor heat exchanger thermistor is normal
& ($Te \leq 0°C$, $Te \leq 0.4Ta-10°C$) —changing SW→ & ($Te \leq 0°C$, $Te \leq 0.4Ta-6°C$)</td></tr>
<tr><td colspan="2">Outdoor heat exchanger thermistor is malfunction.</td></tr>
<tr><td colspan="3">Outdoor HPS (S2PH) for control is ON.</td></tr>
</table>



(P1346)

(C) Defrosting operation

Each actuator is in the following state during defrosting:

Compressor ON

4-way valve OFF

All outdoor fans OFF

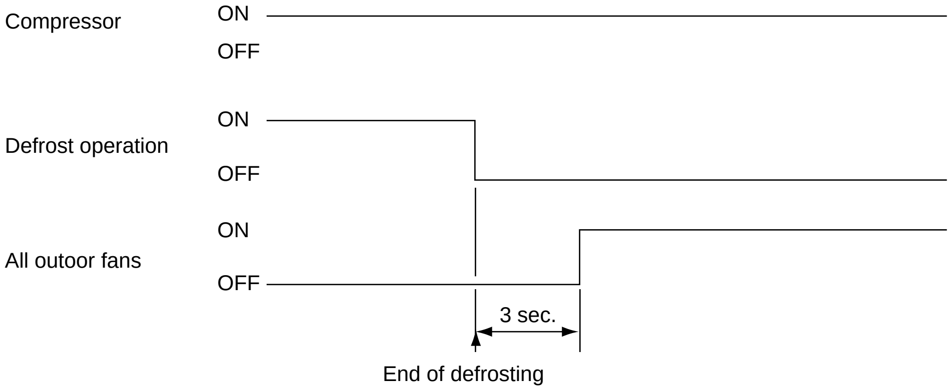
(D) End of defrosting operation

When any one of the following conditions holds during defrosting, the defrosting operation ends:

1. 10 minutes has passed since the start of defrosting.
2. Heat exchanger temperature $T_R \geq 10°C$
3. Outdoor control HPS is actuated (ON→OFF)

(E) Control for delayed ON of outdoor fan

When a thermostat is ON at the end of defrosting, the outdoor fan is turned ON 3 seconds after defrost completion.



(P1347)

6.3.8 Forced Defrosting Function

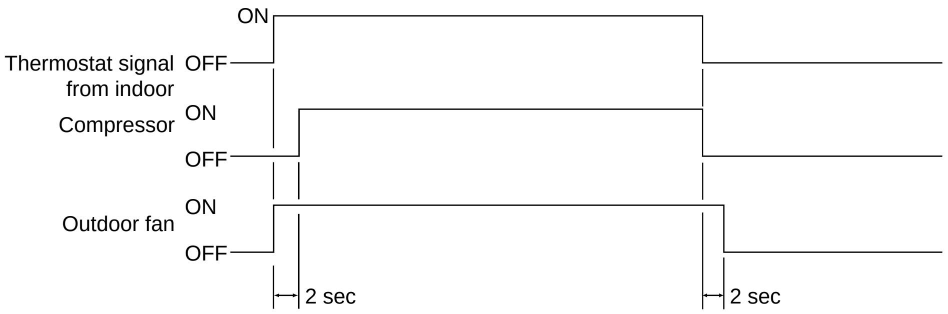
When the following 5 conditions all hold, depressing the forced defrosting push button switch (BS1) on the outdoor board starts defrosting omitting the steps of (A) Prohibition defrosting and (B) Check for defrosting start conditions:

1. Heating run and compressor ON
2. Outdoor control HSP ON
3. Heat exchanger temperature Tr ≤ 10°C.
4. Not in time between defrost request to 6 min. after defrost completion.
5. BS1 is messed.

The conditions for ending a forced defrosting operation are the same as with normal defrosting in 3) above.

6.3.9 Delay in Compressor ON and Outdoor Fan OFF

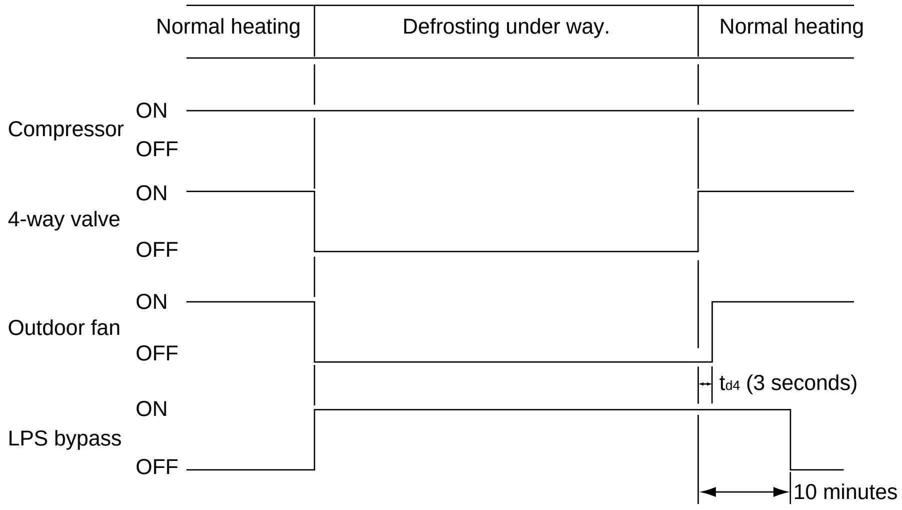
The compressor and the outdoor fan are turned ON / OFF after a delay, as shown below:



(P1348)

6.3.10 Control for Bypassing LPS Actuation during Defrosting

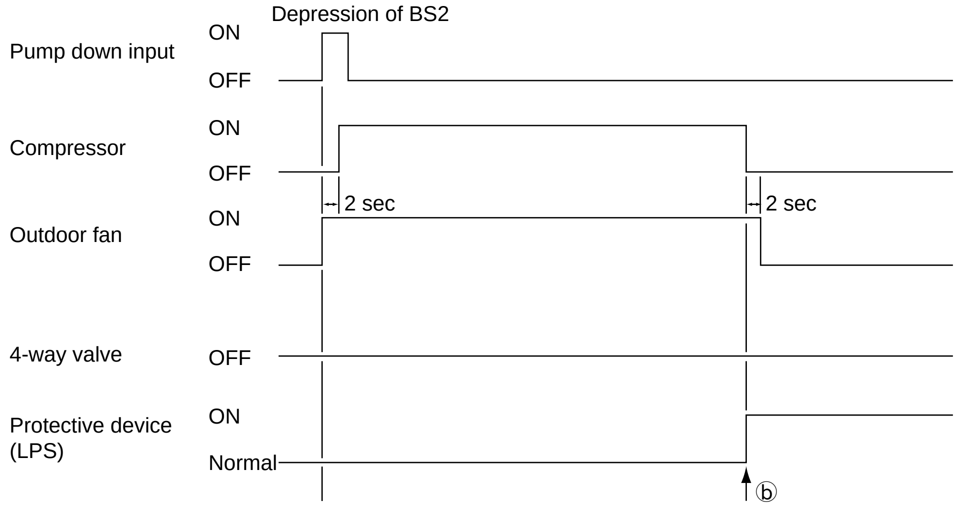
Following control is provided to bypass an abnormal shutdown arising from an LPS actuation during defrosting or immediately after the end of defrosting:



(P1349)

6.3.11 Pump down Function

When the pump down push button switch (BS1) is pressed while unit is stopped, the situation comes into the pump down mode. After closing the stop valve of high pressure side in the outdoor unit, the low pressure switch LPS (S1PL) actuates in a short time and the compressor comes to an abnormal stop.
The stop valve of low pressure side is closed and, a pump down is completed.



(P1350)

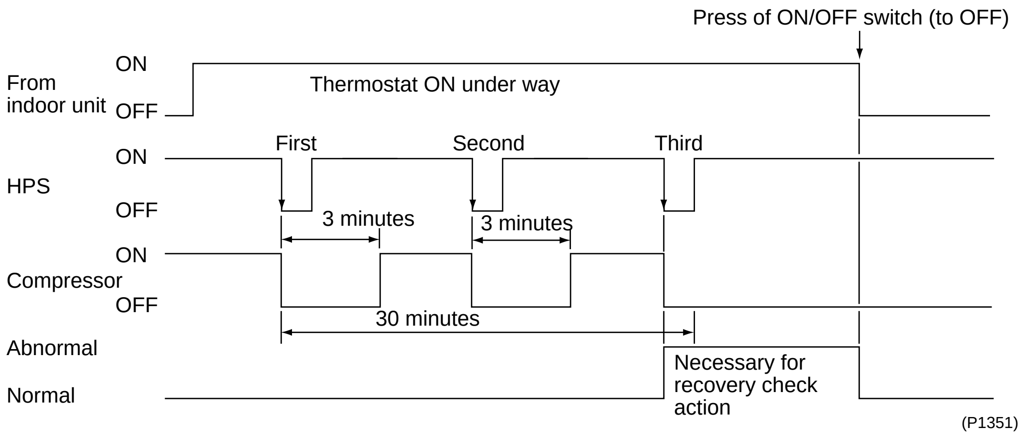
6.3.12 HPS / LPS Detection Function

<In case of R(Y) 200KU model>

If HPS (S1PH) is actuated while compressor is running, the compressor stops and begins standby for 3 minutes.

If this movement is elected an additional 2 times within 30 minutes from the time it is first detected, operation is stopped due to malfunction.

E3.



If LPS (S1LP) is actuated while compressor is runing, operation is stopped due to malfunction.

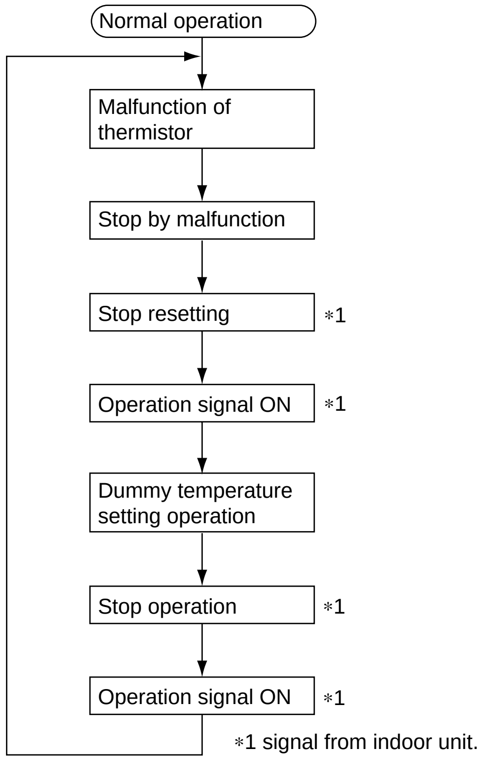
E4.

<In case of R(Y) 250 KU model>

If HPS (S1PH) and LPS (S1LP) are actuated while compressor is running, operation is stopped due to malfunction E3 or E4.

6.3.13 Simulated Operation Function

If the outdoor air thermistor and outdoor unit heat exchange thermistor are malfunctioning, simulated operation is carried out with following procedure while malfunction is displayed on the remote controller.



(P1352)

<Dummy temperature settings during simulated operation>

At cooling	Outdoor air temperature 24°C Outdoor heat exchanger temperature 50°C
At heating	Outdoor air temperature 7°C Outdoor heat exchanger temperature -3°C

6.3.14 Detection of Reverse Phase

If a reverse phase or lack of phase are present in three phase power supply, unit stops immediately due to malfunction.

6.3.15 Detection of Faulty Control HPS (Heat Pump Model only)

At a startup, ON or OFF of the outdoor control HPS is automatically detected. If it is OFF, the control HPS is taken as faulty and unit stops due to malfunction.

Note This decision is not made during a shutdown or operation.

6.3.16 Emergency Operation

- Switches on the control printed circuit boards of both indoor and outdoor units are used for an emergency operation.
  The outdoor unit's control printed circuit board is used for the changeover of the cooling / heating mode.
- No signal is transmitted between the indoor and outdoor units.
- Emergency operation is not possible if the control printed circuit board has a malfunction.
- In heating operation, defrosting operation is activated once every hour.

Part 8 Troubleshooting

1. Maintenance Inspections

1.1 Optimal Operation Condition

Guide Lines for Optimal Operation Condition

The operation value guide lines when operating under standard conditions by pushing the test run button on the remote controller are as given in the table below. RY71~125K are used as example outdoor units in the table.

Indoor Unit Fan: "H" Operation

		High Pressure (Mpa)	Low Pressure (Mpa)	Discharge Pipe Temperature (°C)	Suction Temperature (°C)	Indoor Unit Side: Differential Between Suction Temperature and Discharge Temperature (°C)	Outdoor Unit Side: Differential Between Suction Temperature and Discharge Temperature (°C)
Cooling	50Hz	1.62~1.91 (16.5~19.5)	0.39~0.59 (4.0~6.0)	60~95	0~14	8~18	7~12
	60Hz	1.72~2.10 (17.5~20.5)	0.34~0.54 (3.5~5.5)	70~115	-2~10		
Heating	50Hz	1.42~1.86 (14.5~19.0)	0.29~0.44 (3.0~4.5)	55~95	-4~4	14~30	2~6
	60Hz	1.62~2.01 (16.5~20.5)	0.29~0.44 (3.0~4.5)	60~115	-6~2		

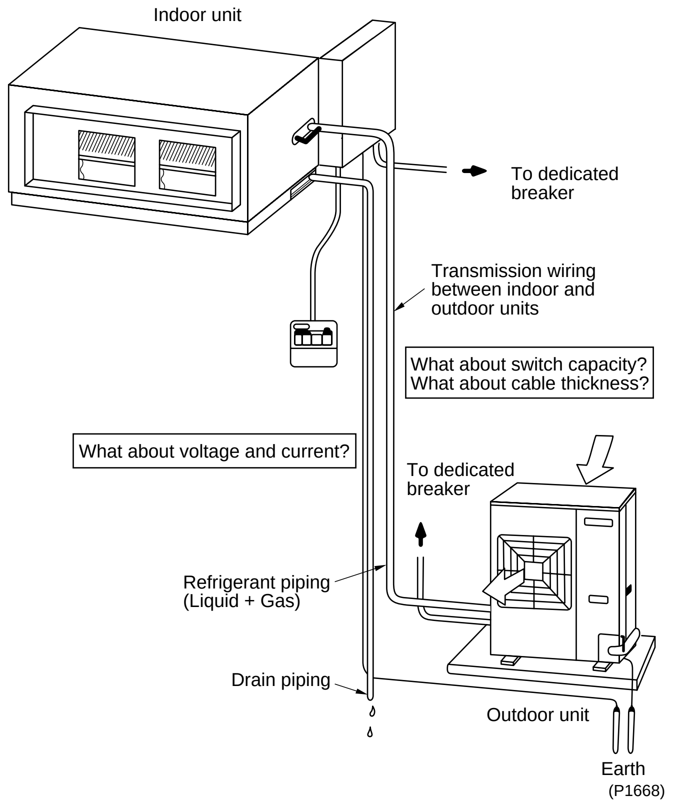
Note: Figures given inside parentheses are in unit of kg/cm²

Standard Conditions

	Indoor Unit Conditions	Outdoor Unit Conditions
Cooling Operation	27°C DB/19°C WB	35°C DB
Heating Operation	20°C DB	7°C DB/6°C WB

■ During or after maintenance, when the power supply is turned back on, operation restarts automatically by the "auto restart function." Please exercise the proper caution.

When performing maintenance, you should at least perform the following inspections.



Correlation of Air-Conditioner's Operation Status and Pressure / Running Current

What happens in comparison to normal values is summarized in the table below.
(Measured from 15 ~ 20 minutes or more after operation starts.)

When Cooling

Air-Conditioner Status	Low Pressure	High Pressure	Running Current
Air Filter Fouling	Lower	Lower	Lower
Short Circuit of Indoor Unit Inlet/ Outlet Air	Lower	Lower	Lower
Outdoor Unit Fin Fouling	Higher	Higher	Higher
Short Circuit of Outdoor Unit Inlet/ Outlet Air	Higher	Higher	Higher
Air Mixed in Refrigerant	Higher	Higher	Higher
Water Mixed in Refrigerant	*1 Lower	Lower	Lower
Dirt Mixed in Refrigerant	*2 Lower	Lower	Lower
Lack of Refrigerant (Gas)	Lower	Lower	Lower
Unsatisfactory Compression	*1 Higher	Lower	Lower

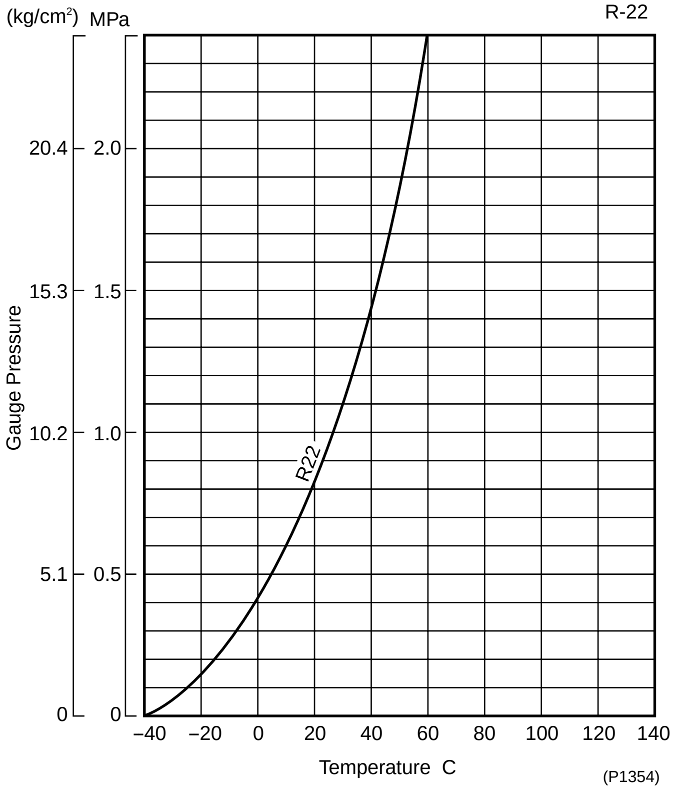
When Heating

Air-Conditioner Status	Low Pressure	High Pressure	Running Current
Air Filter Fouling	Higher	Higher	Higher
Short Circuit of Indoor Unit Inlet/ Outlet Air	Higher	Higher	Higher
Outdoor Unit Fin Fouling	Lower	Lower	Lower
Short Circuit of Outdoor Unit Inlet/ Outlet Air	Lower	Lower	Lower
Air Mixed in Refrigerant	Higher	Higher	Higher
Water Mixed in Refrigerant	*1 Lower	Lower	Lower
Dirt Mixed in Refrigerant	*2 Lower	Lower	Lower
Lack of Refrigerant (Gas)	Lower	Lower	Lower
Unsatisfactory Compression	*3 Higher	Lower	Lower

Note:

1. *1. Water in the refrigerant freezes inside the capillary tube or expansion valve, and is basically the same phenomenon as pump down.
2. *2. Dirt in the refrigerant clogs filters inside the piping, and is basically the same phenomenon as pump down.
3. *3.Pressure differential between high and low pressure becomes slight.

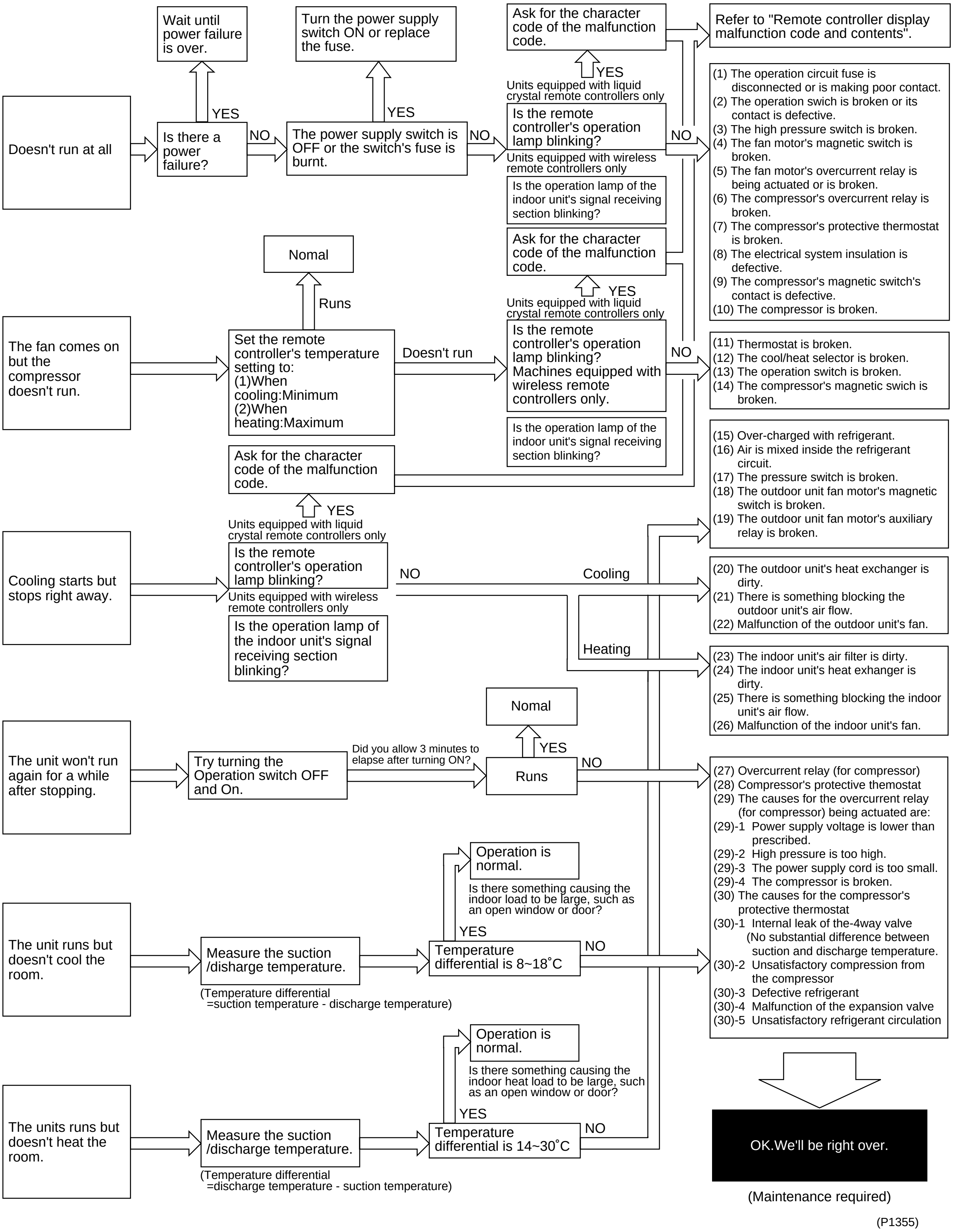
Refrigerant Saturation Curve



2. How to Handle Request for Maintenance

2.1 Flow Chart

Find out the situation according to the following procedure when there is a request for service from the customer.



3. Troubleshooting Based on Equipment Condition

3.1 Troubleshooting Based on Equipment Condition

	Equipment Condition	Remedy
1	Equipment does not operate.	See page 212
2	Fan operates, but compressor does not.	See page 213
3	Cooling/heating operation starts but stops immediately.	See page 214
4	After equipment shuts down, it cannot be restarted for a while.	See page 215
5	Equipment operates but does not provide cooling.	See page 217
6	Equipment operates but does not provide heating.	See page 219
7	Equipment discharges white mist.	See page 221
8	Equipment produces loud noise or shakes.	See page 222
9	Equipment discharges dust.	See page 223
10	Remote controller LCD displays “88.”	See page 224
11	Equipment emits odor.	Room smell and cigarette odors accumulated inside the indoor unit are discharged with air. Inside of the indoor unit must be cleaned.
18	Indoor unit fan operates after heating operation stops.	It is normal.

3.2 Equipment does not Operate

Applicable Model FDY-K(A) series

Error Detection Method

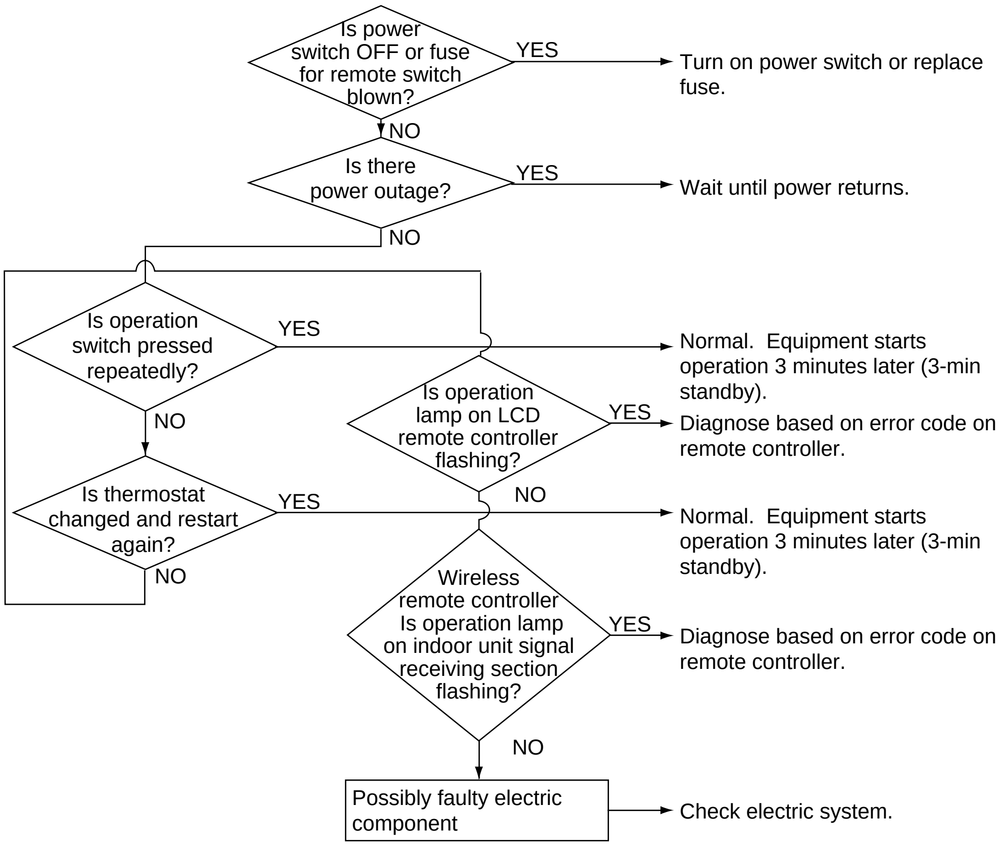
Error Generating Condition

Possible Causes

- Fuse blown or disorder of contact in operation circuit
- Faulty operation switch or contact point
- Faulty high pressure switch
- Faulty magnetic switch for fan motor
- Activation or fault of overcurrent relay for fan motor
- Faulty overcurrent relay for compressor
- Faulty compressor protection thermostat
- Insufficient insulation in electric system
- Faulty contact point of magnetic switch for compressor
- Malfunction of compressor

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1356)

3.3 Fan Operates, but Compressor does not.

Applicable Model FDY-K(A) series

Error Detection Method

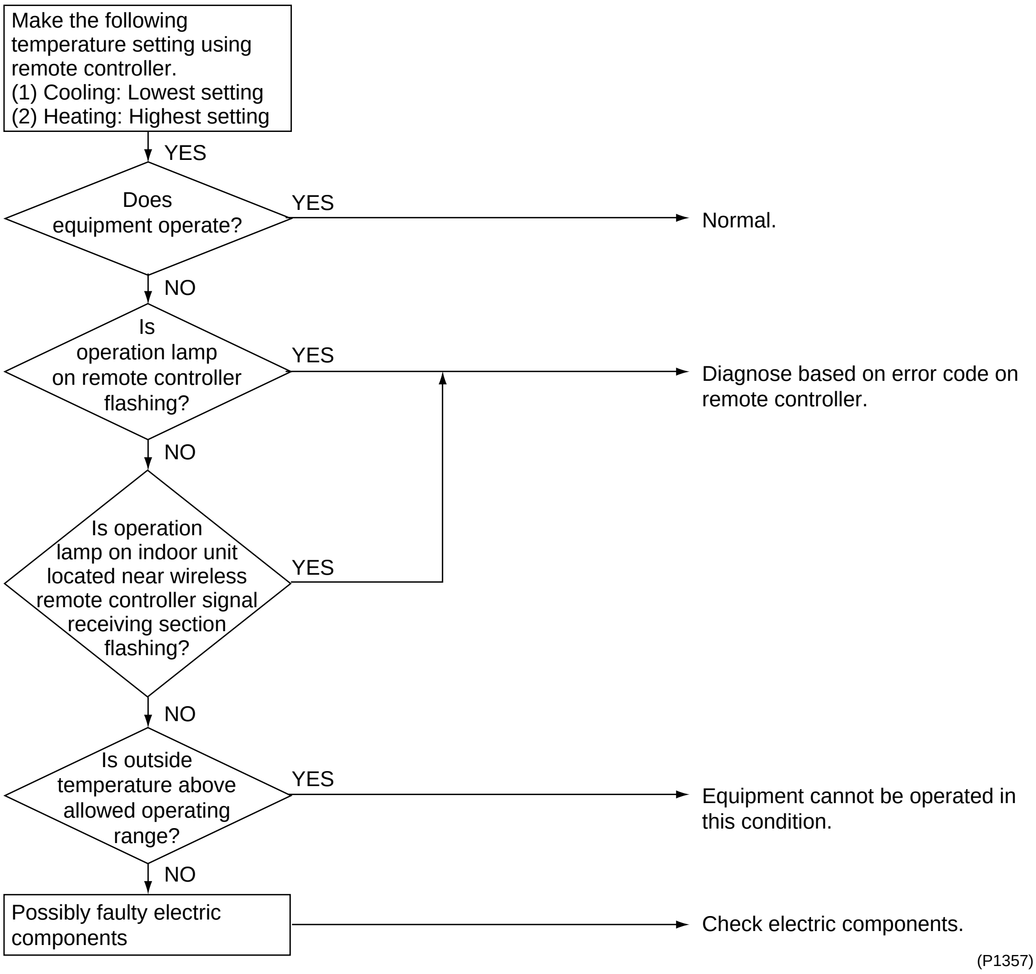
Error Generating Condition

Possible Causes

- Faulty remote controller
- Faulty magnetic switch for compressor

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



3.4 Cooling/Heating Operation Starts but Stops Immediately.

Applicable Model FDY-K(A) series

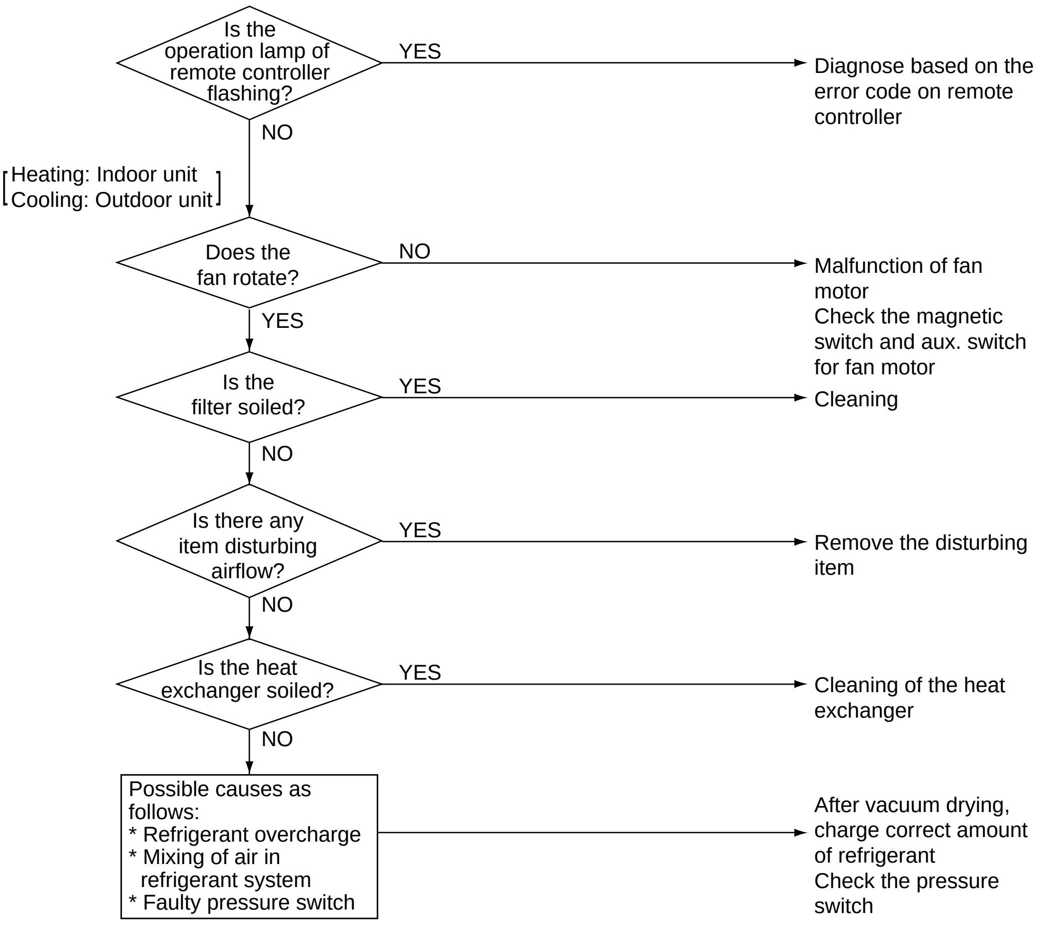
Error Detection Method

Error Generating Condition

Possible Cause

- Excess charge of refrigerant
- Air intrudes into refrigerant system
- Faulty pressure switch
- Faulty magnetic switch for outdoor unit fan motor
- Faulty aux. relay for outdoor unit fan motor
- Soiled heat exchanger of outdoor unit
- There is an interfering item in air flow of outdoor unit
- Malfunction of outdoor unit fan
- Soiled air filter of indoor unit
- Soiled heat exchanger of indoor unit
- There is some interfering item in airflow of indoor unit
- Malfunction of indoor unit fan

Troubleshooting



(P1358)

3.5 After Equipment Shuts Down, It cannot be Restarted for a While.

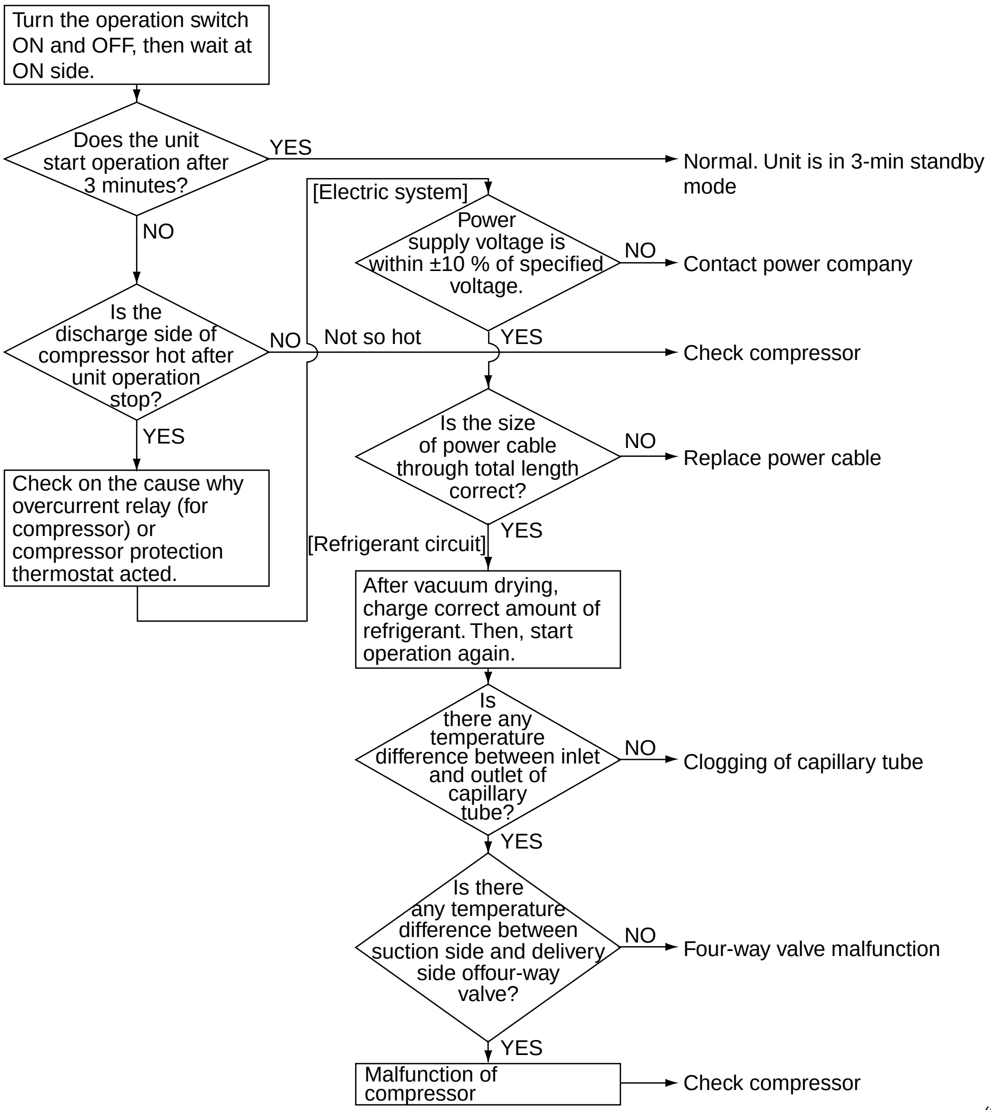
Applicable Model	FDY-K(A) series
Error Detection Method	
Error Generating Condition	

Possible Cause

- Overcurrent relay (for compressor)
- Compressor protection thermostat
- Overcurrent relay may act due to the following reasons
  Lower voltage of power supply
  Excess level of high pressure
  Insufficient capacity of power cable
  Malfunction of compressor
- Compressor protection thermostat may act due to the following reasons
  Internal leakage of four-way valve (There is no difference between inlet and outlet temperature)
  Insufficient compression of compressor
  Incorrect refrigerant
  Clogging capillary tube
  Insufficient circulation of refrigerant

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(S1359)

3.6 Equipment Operates but does not Provide Cooling.

Applicable Model

FDY-K(A) series

Error Detection Method

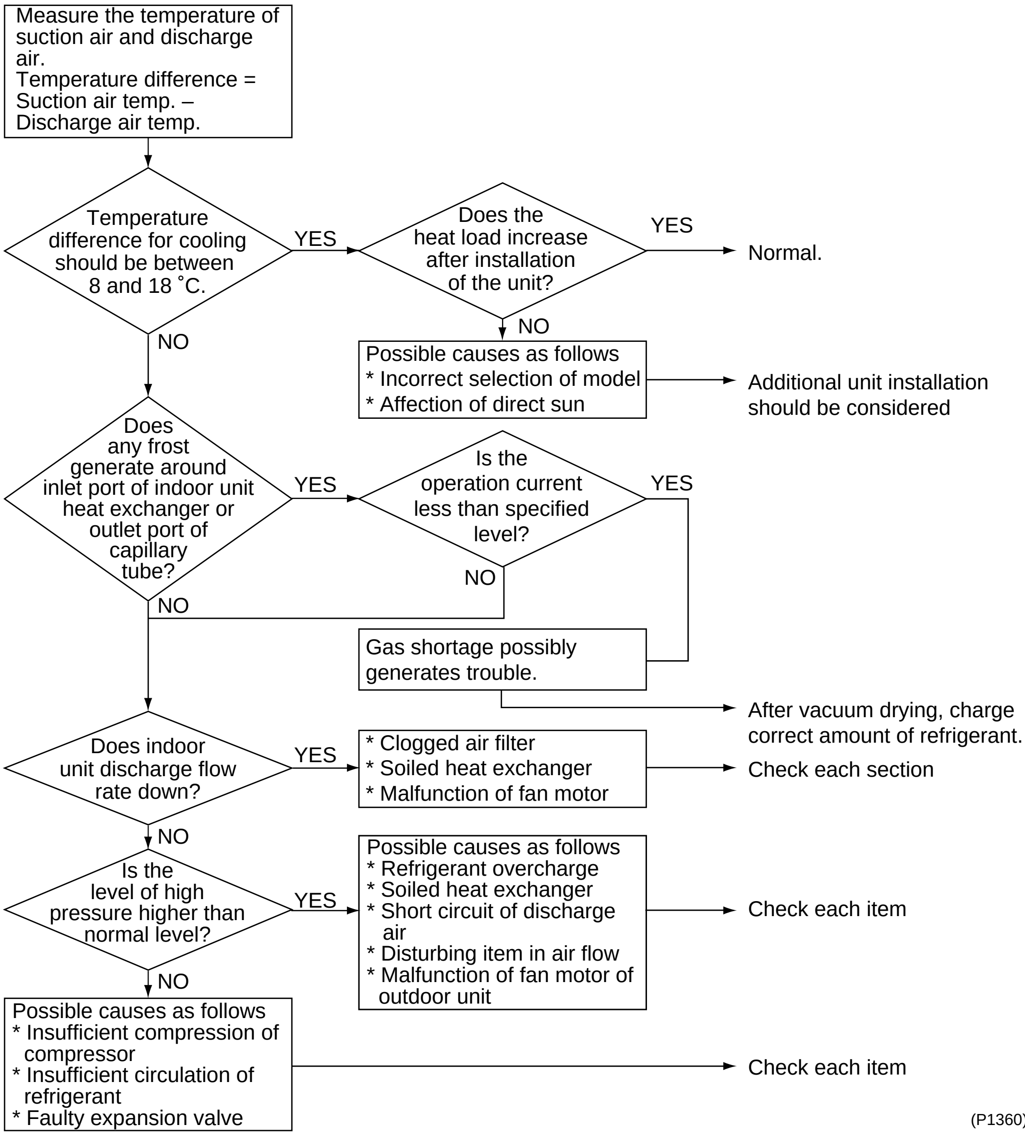
Error Generating Condition

Possible Cause

- Overcurrent relay (for compressor)
- Compressor protection thermostat
- Overcurrent relay may act due to the following reasons
  Lower voltage of power supply
  Excess level of high pressure
  Insufficient capacity of power cable
  Malfunction of compressor
- Compressor protection thermostat may act due to the following reasons
  Internal leakage of four-way valve (There is no difference between inlet and outlet temperature)
  Insufficient compression of compressor
  Incorrect refrigerant
  Faulty expansion valve
  Insufficient circulation of refrigerant

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1360)

3.7 Equipment Operates but does not Provide Heating.

Applicable Model FDY-K(A) series

Error Detection Method

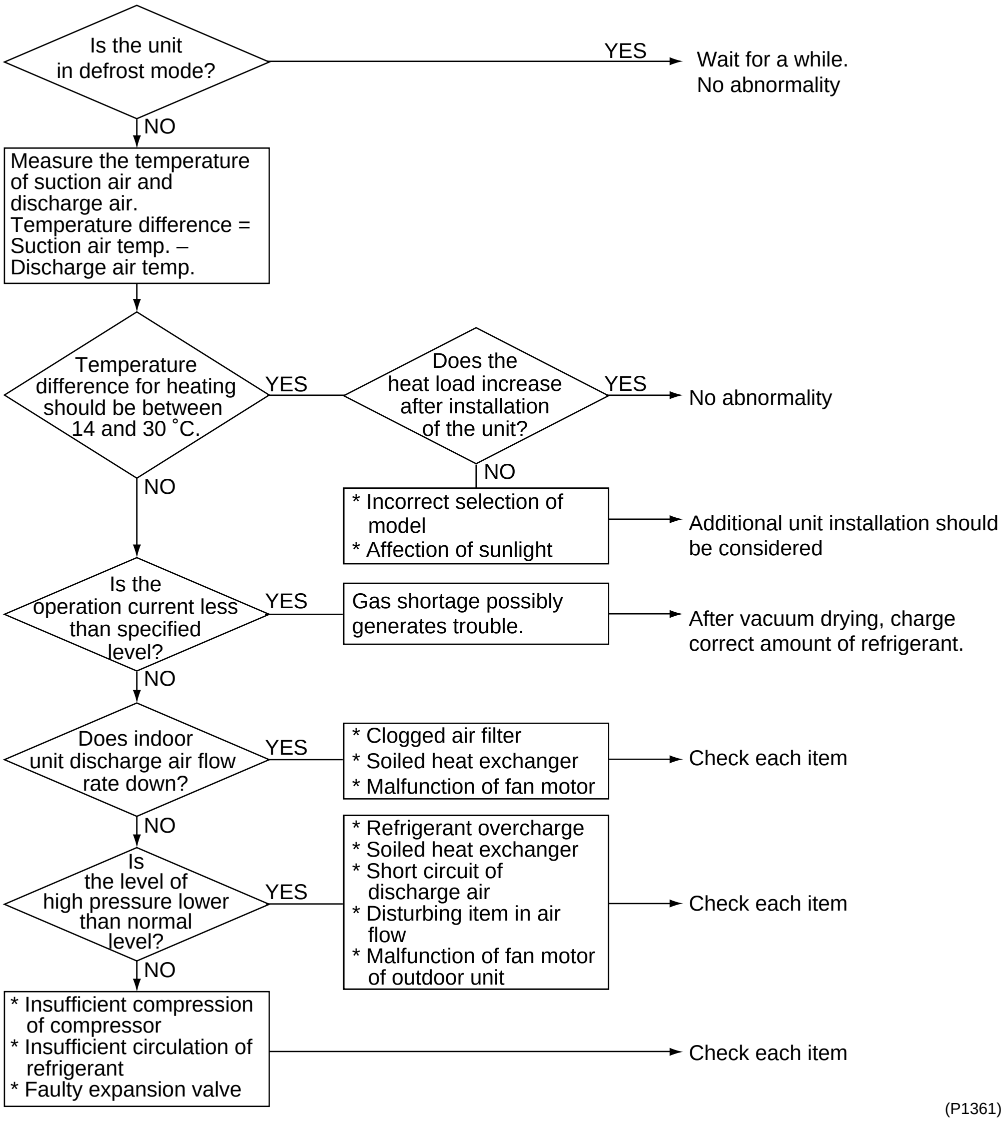
Error Generating Condition

Possible Cause

- Excess charge of refrigerant
- Air intrudes into refrigerant system
- Faulty pressure switch
- Faulty magnetic switch for outdoor unit fan motor
- Faulty aux. relay for outdoor unit fan motor
- Soiled heat exchanger of outdoor unit
- There is an interfering item in air flow of outdoor unit
- Malfunction of outdoor unit fan
- Soiled air filter of indoor unit
- Soiled heat exchanger of indoor unit
- There is some interfering item in airflow of indoor unit
- Malfunction of indoor unit fan

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



3.8 Equipment Discharges White Mist

Applicable Model FDY-K(A) series

Error Detection Method

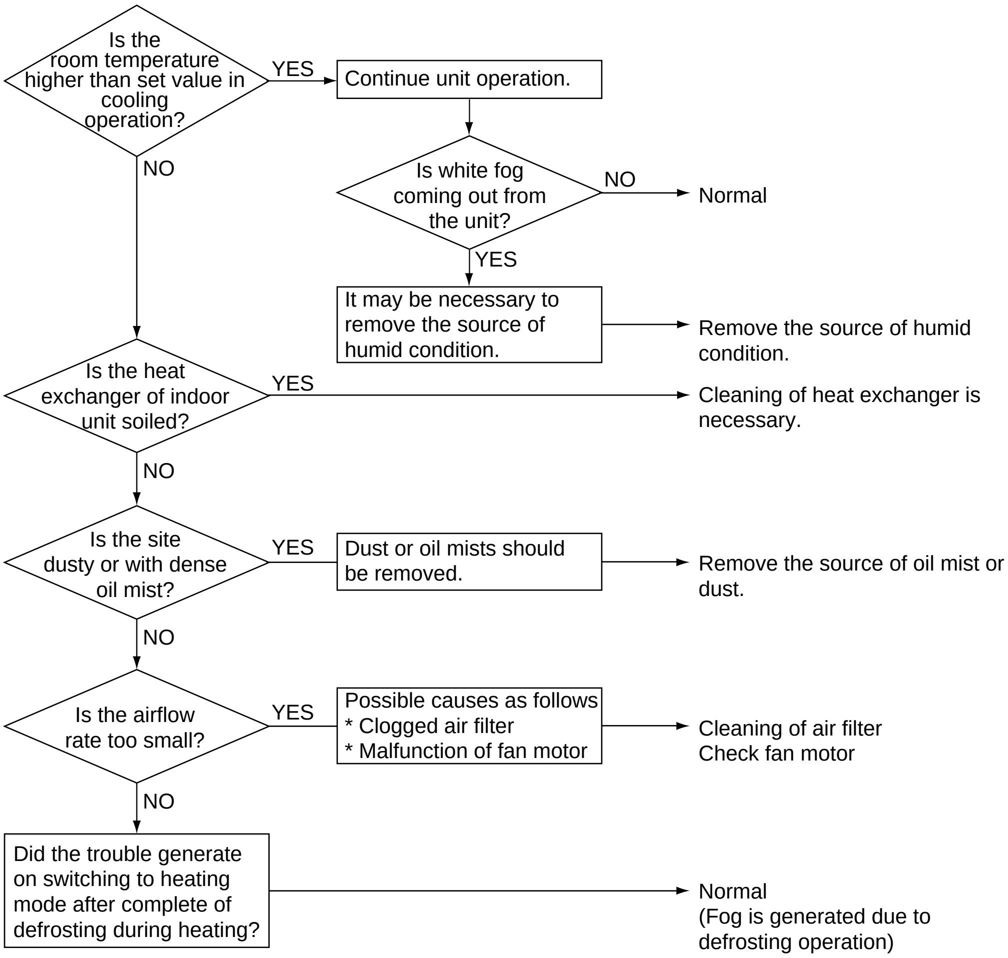
Error Generating Condition

Possible Cause

- Humid installation site
- Installation site is dirty and with dense oil mists.
- Soiled heat exchanger
- Clogged air filter
- Malfunction of fan motor

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1362)

3.9 Equipment Produces Loud Noise or Shakes

Applicable Model FDY-K(A) series

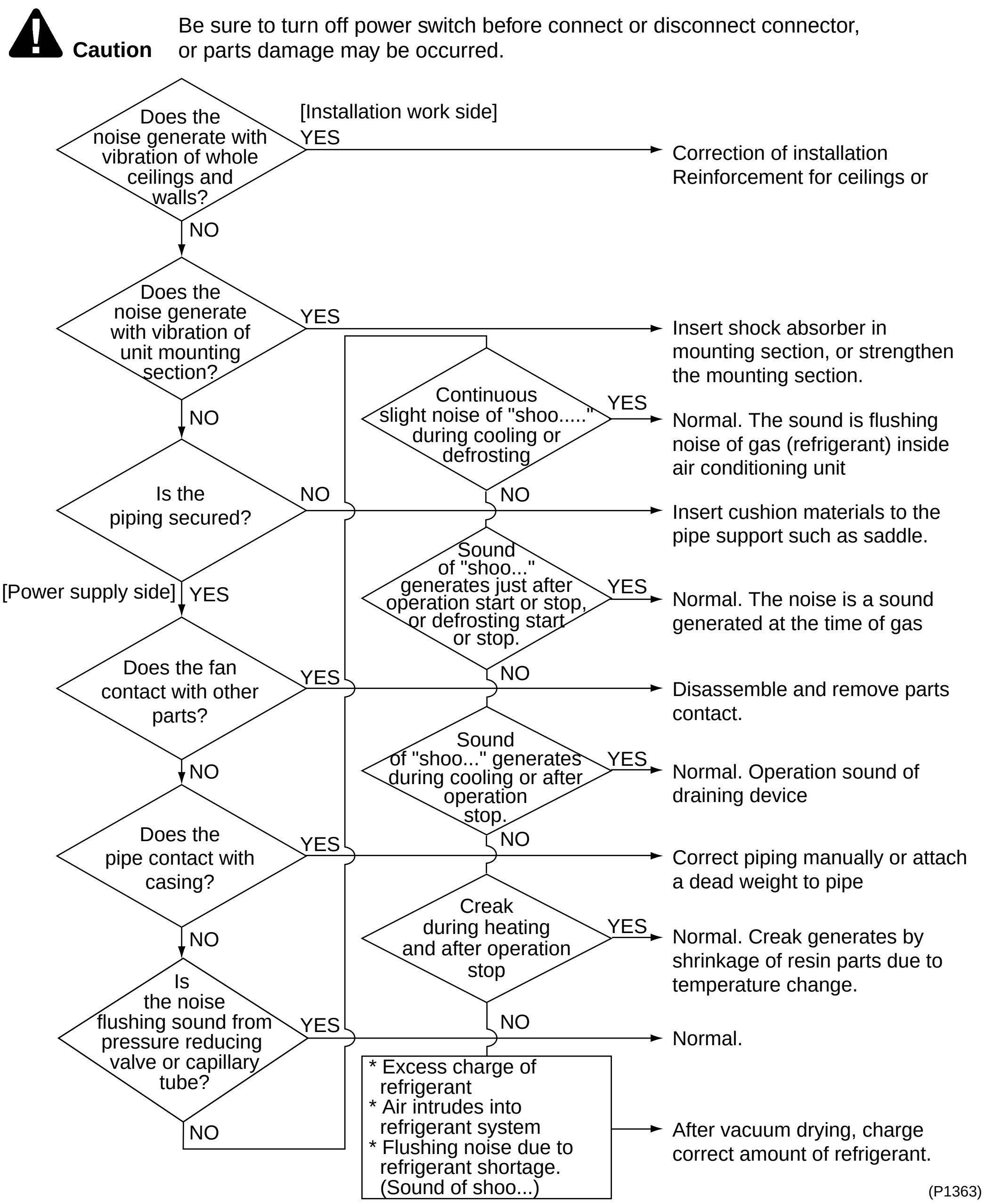
Error Detection Method

Error Generating Condition

Possible Cause

- Excess charge of refrigerant
- Air intrudes into refrigerant system
- Flushing noise due to refrigerant shortage. (Sound of shooee)

Troubleshooting



3.10 Equipment Discharges Dust.

Applicable Model

FDY-K(A) series

Error Detection Method

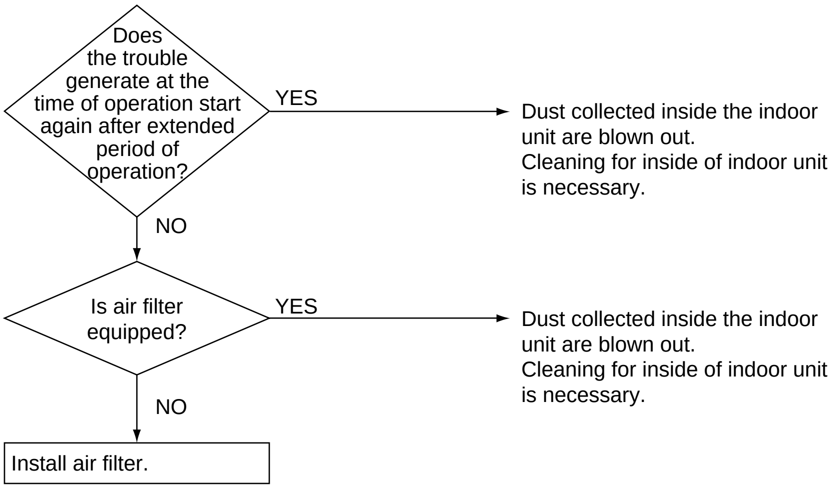
Error Generating Condition

Possible Cause

- Carpet spread room
- Animal's hair

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

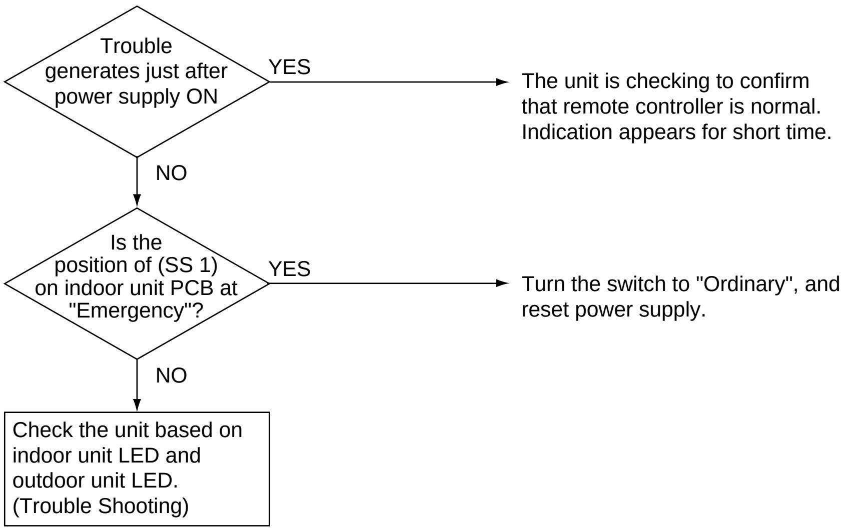


(P1364)

3.11 Remote Controller LCD Displays "88".

Applicable Model	FDY-K(A) series
Error Detection Method	
Error Generating Condition	
Possible Cause	
Troubleshooting	

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1365)

4. Procedure of Self-Diagnosis by Remote Controller

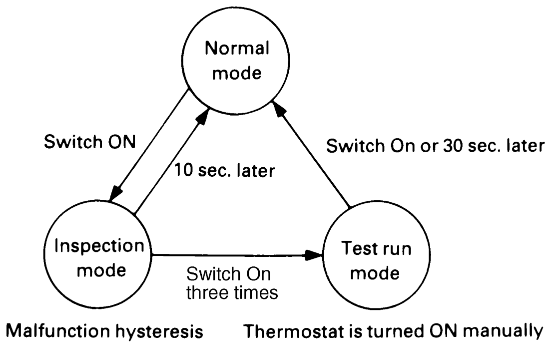
4.1 The INSPECTION/TEST Button

Explanation

By turning the remote controller's inspection /test button ON, you can change the mode as shown in the figure below.

- When in the inspection mode, malfunction contents can be cleared by continuing to press the ON/OFF button for 5 seconds.
  (Let you know completion timing by blinking.)
- To carry out a test run, follow the procedure below.

1. Open the gas side stop valve all the way
2. Open the liquid side stop valve all the way.
3. Energize the crank case heater for 6 hours.
4. Enter the test run mode.
5. Continue to operate by the operation switch for 3 minutes.
6. Enter the normal mode.
7. Check the functions according to the operation manual.



(P1366)

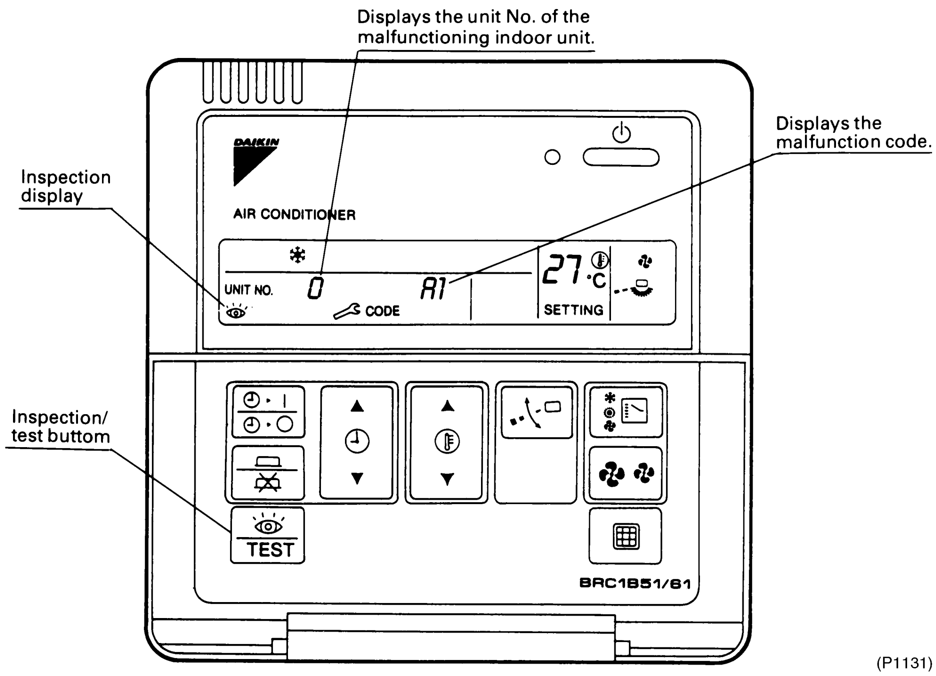
4.2 Self-Diagnosis by Wired Remote Controller

4.2.1 Wired Remote Controller

Explanation

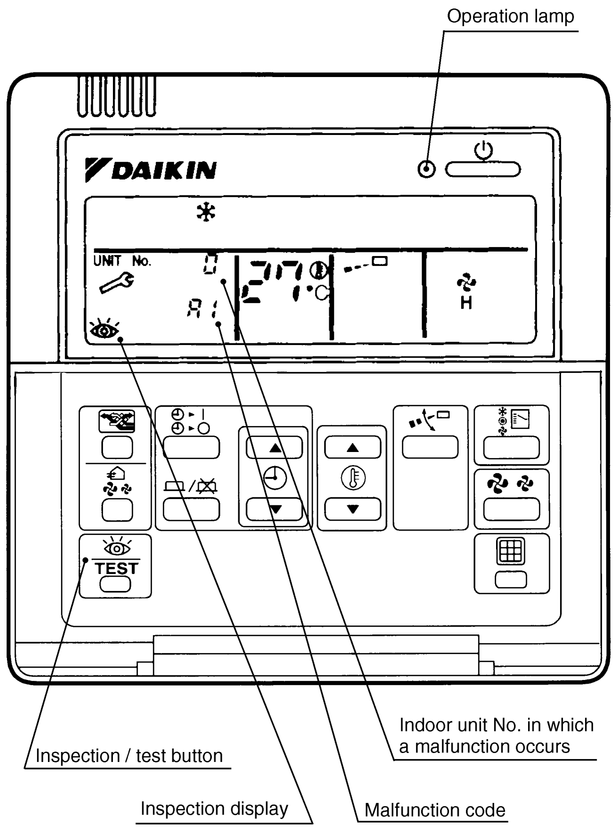
If operation stops due to malfunction, the remote controller's operation LED blinks, and malfunction code is displayed. (Even if stop operation is carried out, malfunction contents are displayed when the inspection mode is entered.) The malfunction code enables you to tell what kind of malfunction caused operation to stop. See page 229 for malfunction code and malfunction contents.

<BRC1B62>



(P1131)

<BRC1C61> For FDY-KA model only



(P1367)

4.2.2 Wireless Remote Controller

<BRC1C61> For FDY-KA model only

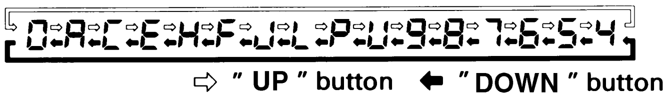
If equipment stops due to a malfunction, the operation indicating LED on the light reception section flashes.

The malfunction code can be determined by following the procedure described below. (The malfunction code is displayed when an operation error has occurred. In normal condition, the malfunction code of the last problem is displayed.)

Procedure

1. Press the INSPECTION/TEST button to select “Inspection.”
   The equipment enters the inspection mode. The “Unit” indication lights and the Unit No. display shows flashing “0” indication.
2. Set the Unit No.
   Press the UP or DOWN button and change the Unit No. display until the buzzer (*1) is generated from the indoor unit.
   ∗1 Number of beeps
   3 short beeps : Conduct all of the following operations.
   1 short beep : Conduct steps 3 and 4.
   Continue the operation in step 4 until a buzzer remains ON. The continuous buzzer indicates that the malfunction code is confirmed.
   Continuous beep : No abnormality.
3. Press the MODE selector button.
   The left “0” (upper digit) indication of the malfunction code flashes.
4. Malfunction code upper digit diagnosis
   Press the UP or DOWN button and change the malfunction code upper digit until the malfunction code matching buzzer (*2) is generated.

■ The upper digit of the code changes as shown below when the UP and DOWN buttons are pressed.

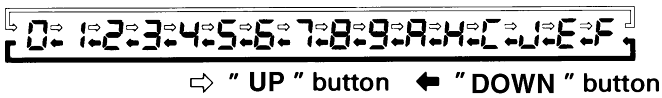


(S1156)

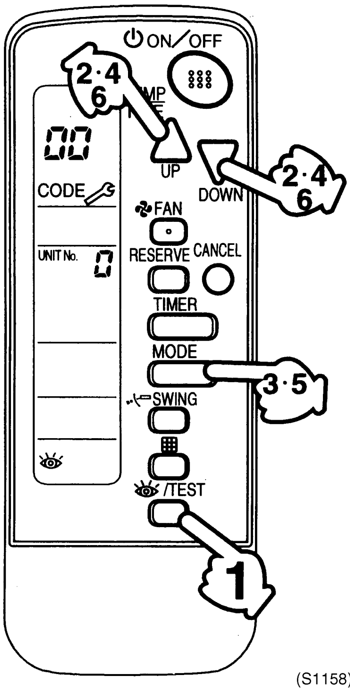
∗2 Number of beeps
Continuous beep : Both upper and lower digits matched.(Malfunction code confirmed)
2 short beeps: Upper digit matched.
1 short beep : Lower digit matched.

5. Press the MODE selector button.
   The right “0” (lower digit) indication of the malfunction code flashes.
6. Malfunction code lower digit diagnosis
   Press the UP or DOWN button and change the malfunction code lower digit until the continuous malfunction code matching buzzer (*2) is generated.

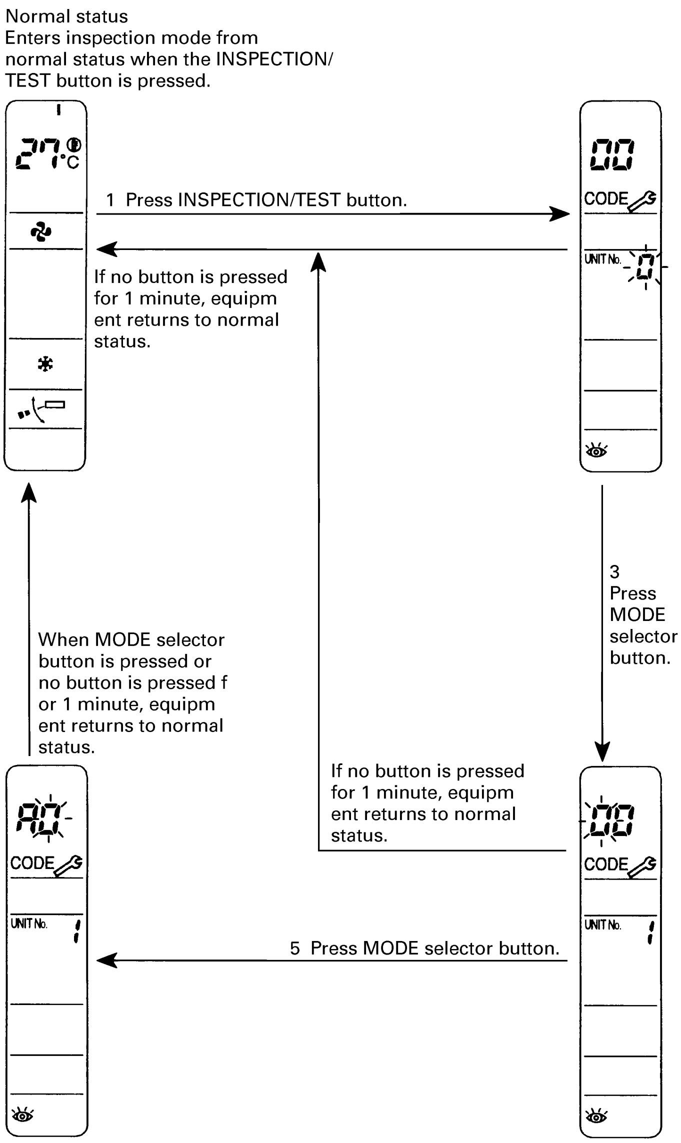
■ The lower digit of the code changes as shown below when the UP and DOWN buttons are pressed.



(S1157)


ON/OFF
2·4
6
UP
DOWN
2·4
6
00
CODE
FAN
UNIT No.
0
RESERVE
CANCEL
TIMER
MODE
3·5
SWING
/TEST
1

(S1158)


Normal status
Enters inspection mode from normal status when the INSPECTION/TEST button is pressed.
27°C
1 Press INSPECTION/TEST button.
00
CODE
UNIT No.
0
If no button is pressed for 1 minute, equipm ent returns to normal status.
3
Press
MODE
selector
button.
When MODE selector button is pressed or no button is pressed f or 1 minute, equipm ent returns to normal status.
If no button is pressed for 1 minute, equipm ent returns to normal status.
A0
CODE
UNIT No.
1
5 Press MODE selector button.
00
CODE
UNIT No.
1

(S1159)

4.3 Remote Controller Display Malfunction Code and Contents

Malfunction Code	Contents/Processing	Remarks
A1	Failure of PC board ass'y for indoor unit	
C4	Malfunction of heat exchanger temperature sensor system	
C9	Malfunction of suction air temperature sensor system	
CJ	Malfunction of remote control temperature sensor system	The remote controller thermistor does not function, but the system thermostat operation is possible.
E0	Actuation of safety device (outdoor unit)	
E1	Outdoor unit P.C. Board is faulty	
E3	High pressure malfunction (outdoor unit)	
E4	Low pressure malfunction (outdoor unit)	
E9	Malfunction of electronic expansion valve (outdoor unit)	
F3	Discharge pipe temperature malfunction (outdoor unit)	
H3	Failure of high pressure switch (outdoor unit)	
H4	Failure of low pressure switch	
H9	Malfunction of outdoor air temperature sensor system (outdoor unit)	(Note 1)
H9		
J3	Malfunction of discharge pipe temperature sensor system (outdoor unit)	
J6	Malfunction of heat exchanger temperature sensor system (outdoor unit)	(Note 1)
J6		
PJ	Failure of capacity setting (outdoor unit)	Either capacity data is set incorrectly, or capacity has not been set for the data IC
U0	Malfunction of suction pipe temperature	
U1	Reverse phase	Switch R.S.T. of the 3-phase power supply.
U4 or UF	Failure of transmission (between indoor and outdoor unit)	Wrong wiring between indoor and outdoor units or malfunction of the PC board mounted on the indoor and the outdoor units. If UF is shown, the wiring between the indoor and outdoor units is not properly wired. Therefore, immediately disconnect the power supply and correct the wiring. (The compressor and the fan mounted on the outdoor unit may start operation independent of the remote controller operation.)
U5	Failure of transmission (between indoor unit and remote controller)	Transmission between indoor and remote controller is not being correctly carried out.
U8	Failure of transmission (between "main" and "sub" remote controller	Transmission between "main" and "sub" remote controller is not being correctly carried out.
UA	Failure of field setting	System setting mistake for Twin system.
UC	Address duplication of central remote controller	

■ In the case of the shaded error codes, "inspection" is not displayed. The system operates, but be sure to inspect and repair it.

Note 1: Operation when a malfunction occurs may differ according to the model.

5. Procedure of Self-Diagnosis by LED

5.1 Troubleshooting by LED on The Indoor Unit's

Foreword

Troubleshooting can be carried out by service monitor LED (green). (Blinks when normal)
☼ : LED on ● : LED off ◐ : LED blinks — : No connection with troubleshooting

Microcomputer Normal Monitor	Transmission Normal Monitor	Details
HAP (H1P)	HBP (H2P)	
◐	◐	Indoor unit is normal → Diagnose the outdoor unit
◐	☼	Malfunction of indoor unit PC board assembly or miswiring between indoor and outdoor unit
	●	If the outdoor unit LED-A does not light, diagnose the outdoor unit. If it flashes, it is due to either miswiring or malfunction of the indoor unit PC board assembly. (NOTE 1)
☼	—	Malfunction of the indoor unit PC board (NOTE 2)
●		Abnomal power supply, malfunction of PC board assembly or disconnection between the indoor and outdoor units (NOTE 2)

Note:

1. If LED-B is off, the transmission wiring between indoor and outdoor unit may be incorrect or disconnected. Before performing the previously described troubleshooting, check the transmission wiring.
2. Troubleshoot by turning off the power supply for a minimum of 5 seconds, turning it back on, and then rechecking the LED display.

5.2 Troubleshooting by LED on The Outdoor Unit's PC Board

With the power supply turned "ON," the troubleshooting listed below by the outdoor unit's maintenance monitor LED.

☼ : LED on ● : LED off ◐ : LED blinks — : No connection with troubleshooting

Microcomputer Normal Monitor HAP (Green)	Malfunction Detection Monitor (Note 3)		Contents/Processing
	H1P (red)	H2P (red)	
◐	●	●	Normal → to outdoor unit
◐	☼	●	Actuation of safety device
	●	☼	Main power supply reverse phase connection of lack of phase
	☼	☼	Malfunction of sensor system
☼	—	—	Failure of outdoor unit PC board (Notes 1)
●	—	—	Malfunction of power supply or failure of outdoor unit PC board (Note 1, 2)

Green LED : Normal when ON, No LED: Normal when OFF

Note:

1. Check troubleshoot by turning off the power supply for a minimum of 5 seconds, turning it back on, and then rechecking the LED display.
2. Turn off the power supply for a minimum of 5 seconds, and when turning it back on after disconnecting transmission wiring No. 2, if the outdoor unit's LED-A blinks, the indoor unit's PC board is defective.
3. Previous malfunction data is displayed on the malfunction detection monitor. After inspecting, turn off the power supply once.

General Precautions When Performing Maintenance

1. When disconnecting the fasten terminal from the PC board, hold down the PC board with your finger and do not apply excessive force. Also, do not hold the neck of the fasten terminal and pull the lead wire.
2. Do not use a mega tester on the secondary side (transformer secondary side) of the electronic circuitry.
3. Even when not energized, beware of static electricity when touching parts or pattern. (If handling PC board when dry [winter], be sure to discharge the electrostatic charge by grounding. Do not touch any other grounded metal parts with your fingers.)

6. Troubleshooting by Remote Controller Display / LED Display

6.1 Explanation for Symbols

◑ : Blinks ☼ : On ● : Off — : No connection with troubleshooting

◎ : High probability of malfunction
○ : Possibility of malfunction
□ : Low probability of malfunction
— : No possibility of malfunction (do not replace)

6.2 Malfunction Code and LED Display Table

Indoor Unit

Indoor Unit Malfunctions	Indoor Unit LED Display Note 2		Remote Controller Display	Location of Malfunction				Contents of Malfunction	Details of Malfunction (Reference Page)
	H1P (HAP)	H2P (HBP)		Other than PC Board	PC Board Outdoor Unit	PC Board Indoor Unit	PC Board Remote Controller		
	◐	◐	*Note 1	—	—	—	—	Normal → to outdoor unit	—
	◐	☼	A1	—	—	○	—	Failure of indoor unit PC board (For troubleshooting by LED, refer to p.230.)	235
	◐	●							
	☼	—							
	●	—							
	◐	◐	C4	◎	—	□	—	Malfunction of heat exchange temperature sensor system	236
	◐	◐	C9	◎	—	□	—	Malfunction of suction air temperature sensor system	237
	◐	◐	CJ	◎	—	○	—	Malfunction of remote controller air thermistor	238

Outdoor Unit

Outdoor Unit Malfunctions	Outdoor Unit LED Display			Remote Controller Display	Location of Malfunction				Contents of Malfunction	Details of Malfunction (Reference Page)
	HAP	H1P	H2P		Other than PC Board	PC Board Outdoor Unit	PC Board Indoor Unit	PC Board Remote Controller		
	◐	●	●	Note 1∗	—	—	—	—	Normal → to indoor unit	—
	◐	☼	●	E0	◎	□	—	—	Actuation of safety device	239,240
	☼	—	—	Note 1∗	—	○	—	—	Failure of outdoor unit PC board	—
	●	—	—	Note 1∗	—	○	—	—	Malfunction of power supply or failure of outdoor unit PC board	—
	◐	—	—	E1	—	○	—	—	Failure of outdoor unit P.C. board	241
	◐	☼	●	E3	◎	—	—	—	High pressure system (HPS) malfunction	242
	◐	☼	●	E4	◎	—	—	—	Low pressure system (LPS) malfunction	243
	◐	●	●	E9	◎	□	—	—	Malfunction of electronic expansion valve	244
	◐	●	●	F3	◎	□	—	—	Discharge pipe temperature malfunction	245
	◐	☼	☼	H3	◎	□	—	—	Malfunction of high pressure switch	246
	◐	☼	☼	H4	◎	□	—	—	Malfunction of low pressure switch	247
	◐	☼	☼	H9	◎	□	—	—	Malfunction of outdoor air temperature sensor system	248
	◐	☼	☼	J3	◎	□	—	—	Malfunction of discharge pipe temperature sensor system	249
	◐	☼	☼	J6	◎	□	—	—	Malfunction of heat exchanger temperature sensor system	250

Note: 1. The asterisk (∗) indicates variety of circumstances.

System

System Malfunctions	Outdoor Unit LED Display			Remote Controller Display	Location of Malfunction				Contents of Malfunction	Details of Malfunction (Reference Page)
	HAP	H1P	H2P		Other than PC Board	PC Board				
						Outdoor Unit	Indoor Unit	Remote Controller		
	—			U0	◎	—	—	—	Short of gas malfunction	251
	◑	●	☼	U1	◎	□	—	—	Reverse phase	252
	—			U4 or UF	◎	○	○	—	Malfunction of transmission (between indoor and outdoor unit)	253
	—			U5	◎	—	○	○	Malfunction of transmission (between indoor unit and remote controller)	256
	—			U8	◎	—	○	○	Transmission error between "main" remote controller and "sub" remote controller	257
	—			UA	◎	—	○	—	Failure of field setting switch	258

6.3 Failure of Indoor Unit PC Board

Remote Controller Display

A1

Applicable Models

FDY-K models

Method of Malfunction Detection

Check data from E^{2}PROM.

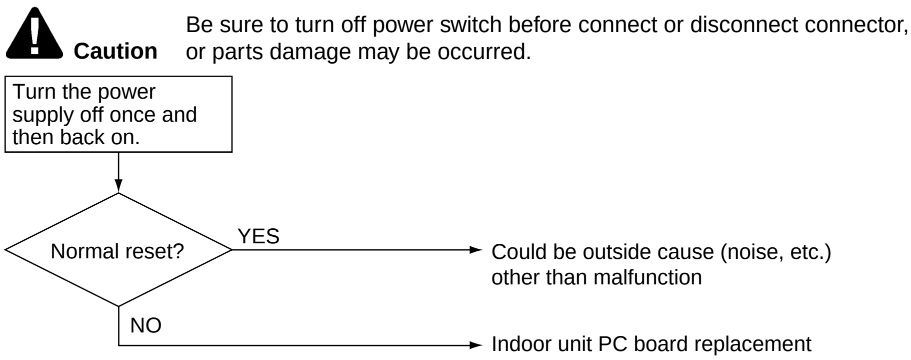
Malfunction Decision Conditions

When data could not be correctly received from the E^{2}PROM
E^{2}PROM : Type of nonvolatile memory. Maintains memory contents even when the power supply is turned off.

Supposed Causes

- Failure of PC board

Troubleshooting



(P1368)

Note: Measure the resistance while referring to the thermistor temperature and resistance conversion table. Refer to page 181.

6.4 Malfunction of Heat Exchange Temperature Sensor System

Remote Controller Display

C4

Applicable Models

FDY-K models

Method of Malfunction Detection

Malfunction detection is carried out by temperature detected by heat exchanger sensor.

Malfunction Decision Conditions

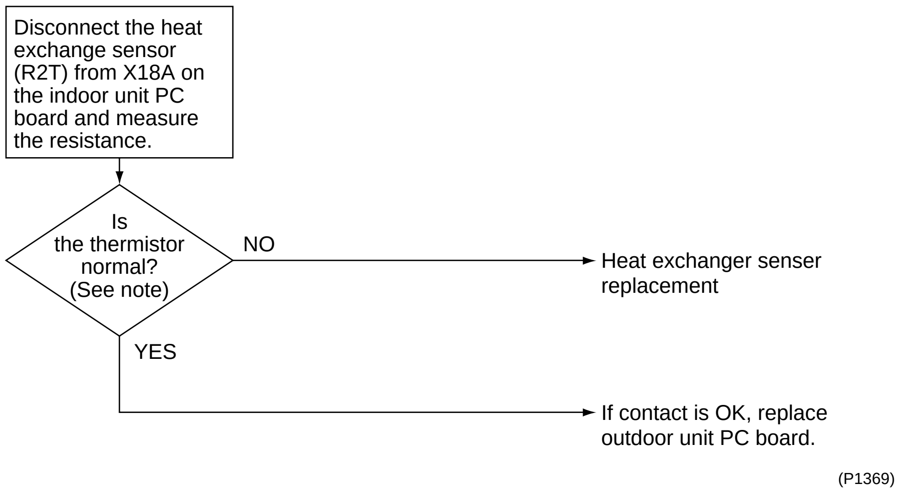
When the heat exchanger thermistor becomes disconnected or shorted while the unit is running.

Supposed Causes

- Failure of the sensor itself
- Broken or disconnected wire
- Failure of electronic circuitry (indoor unit PC board)
- Failure of connector contact

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



6.5 Malfunction of Suction Air Temperature Sensor System

Remote Controller Display

C9

Applicable Models

FDY-K models

Method of Malfunction Detection

Malfunction detection is carried out by temperature detected by suction air temperature sensor.

Malfunction Decision Conditions

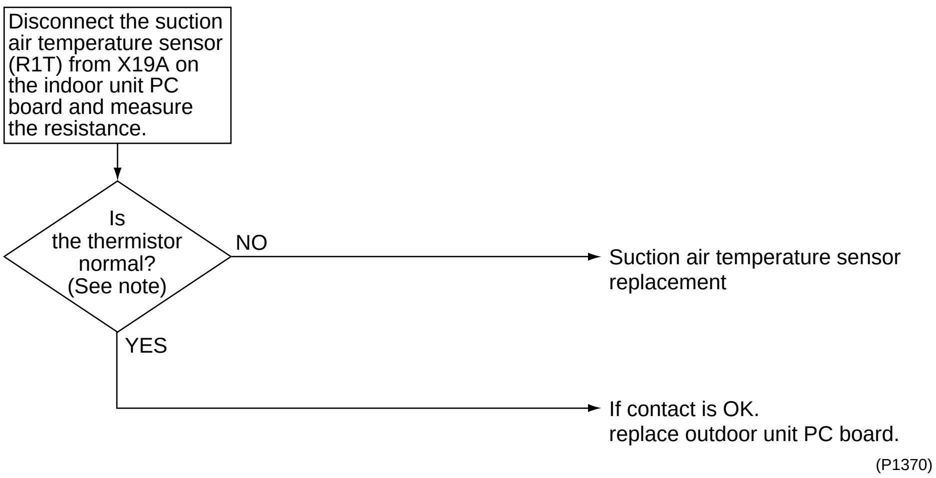
When the suction air temperature sensor's thermistor becomes disconnected or shorted while the unit is running.

Supposed Causes

- Failure of the sensor itself
- Broken or disconnected wire
- Failure of indoor unit PC board
- Failure of connector contact

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



Note: Measure the resistance while referring to the thermistor temperature and resistance conversion table. Refer to page 181.

6.6 Malfunction of Remote Controller Air Thermistor

Remote Controller Display

CJ

Applicable Models

FDY-K models

Method of Malfunction Detection

Even if remote controller thermistor is faulty, system is possible to operate by system thermistor. Malfunction detection is carried out by temperature detected by remote controller thermistor.

Malfunction Decision Conditions

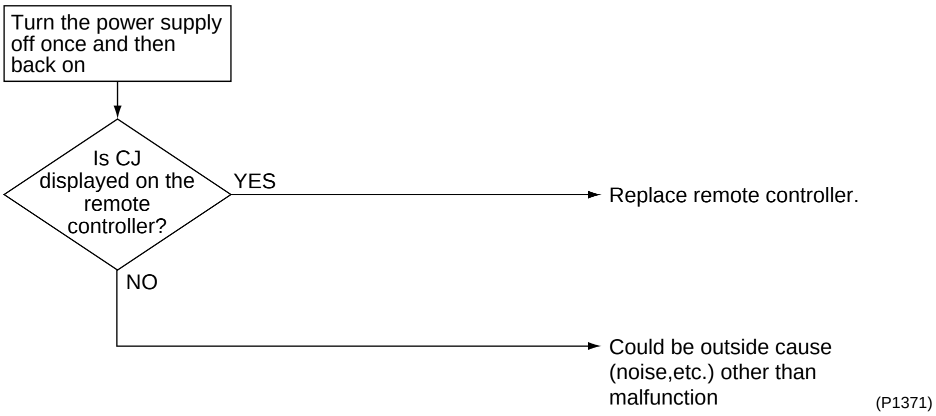
When the remote controller thermistor becomes disconnected or shorted while the unit is running.

Supposed Causes

- Failure of sensor itself
- Broken wire

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



6.7 Actuation of Safety Device

Remote Controller Display

E0

Outdoor Unit LED Display

HAP ◐ H1P ☼ H2P ●

Applicable Models

RY140KU only

Method of Malfunction Detection

Actuation of each safety device is detected by safety device input circuit.
(Safety device unified detection)

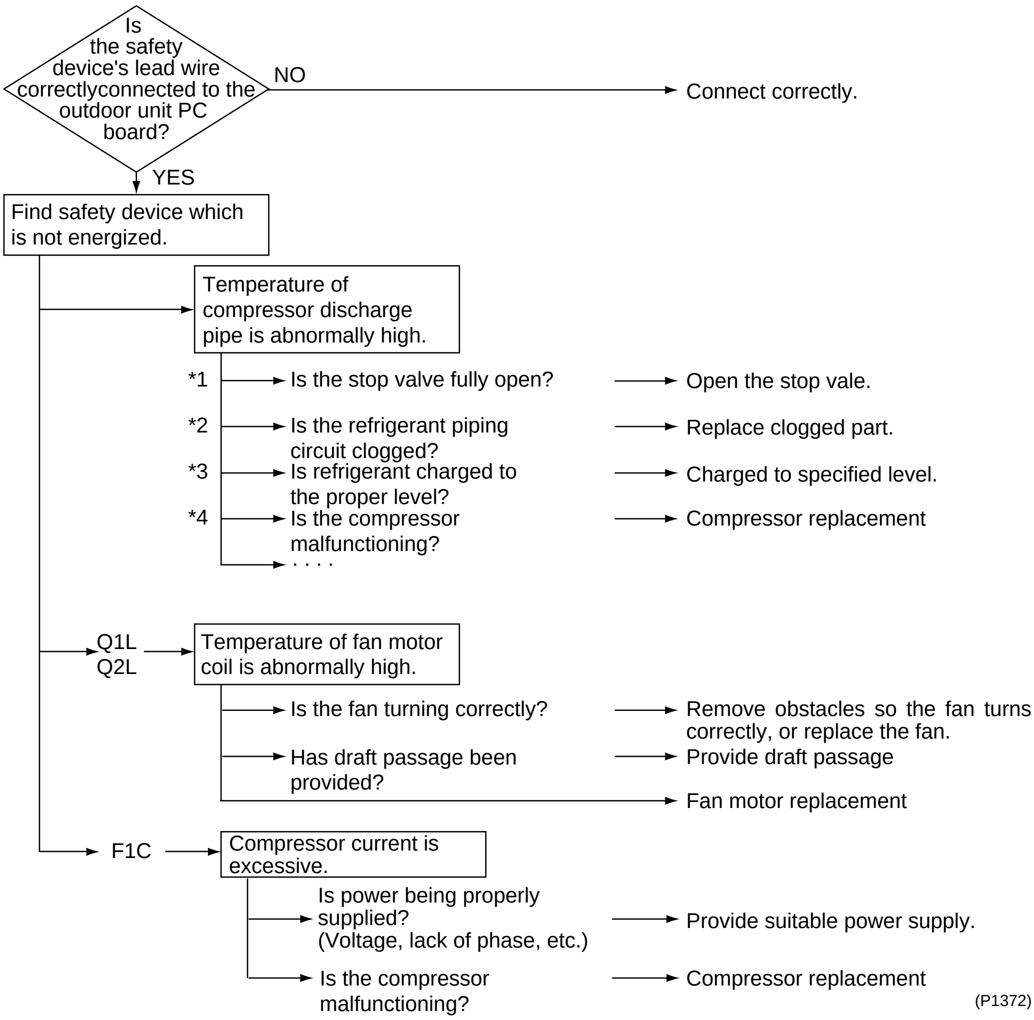
Supposed Causes

<Causes related to PC board>
- Failure of outdoor unit PC board
- Failure of safety device input connection
- Safety device's harness is broken or disconnected

<Causes related to product as a whole>
- Stop valve is set to "close"
- Refrigerant piping circuit clogging

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1372)

6.8 Actuation of Safety Device

Remote Controller Display

E0

Outdoor Unit LED Display

HAP ◑ H1P ☼ H2P ●

Applicable Models

R(Y) 200·250KU only

Method of Malfunction Detection

Actuation of each safety device is detected by safety device input circuit.
(Safety device unified detection)

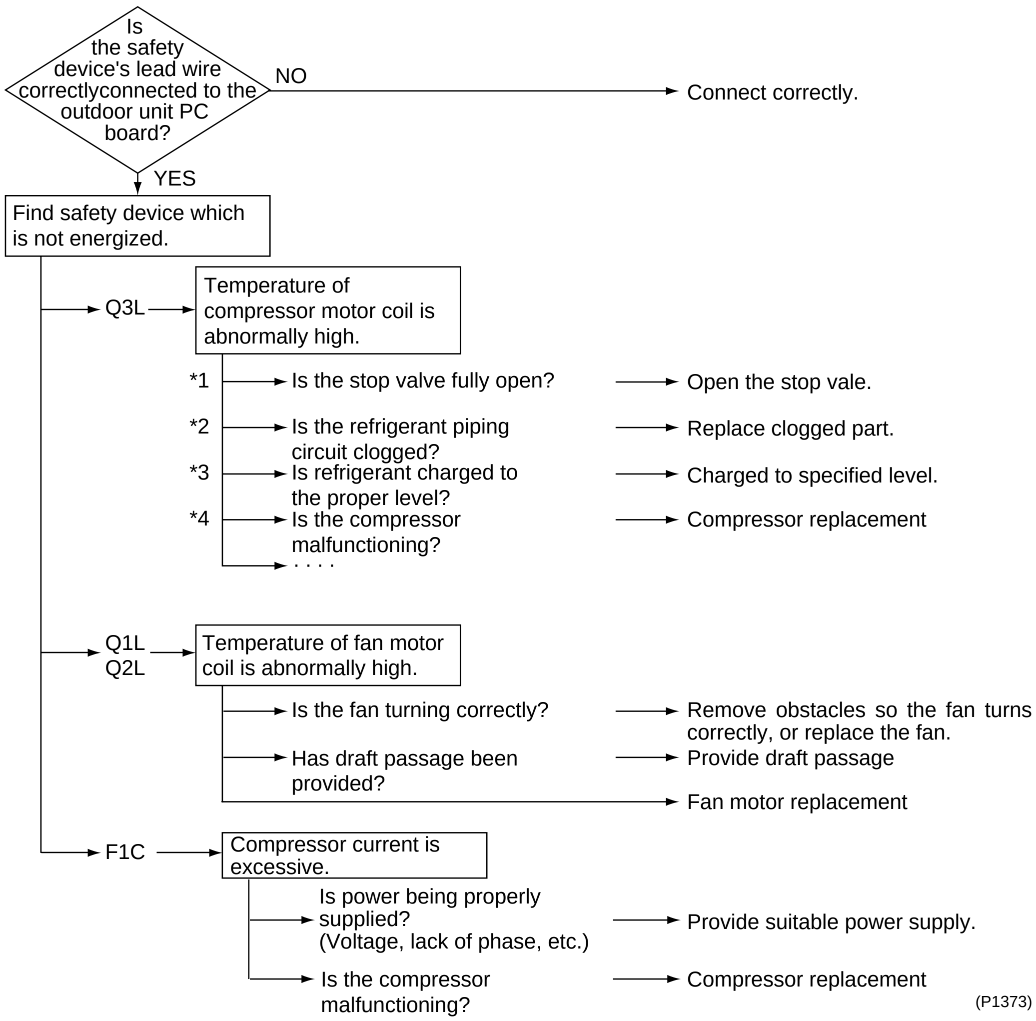
Supposed Causes

<Causes related to PC board>
- Failure of outdoor unit PC board
- Failure of safety device input connection
- Safety device's harness is broken or disconnected

<Causes related to product as a whole>
- Stop valve is set to "close"
- Refrigerant piping circuit clogging

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



6.9 Failure of Outdoor Unit PC Board

Remote Controller Display

E1

Outdoor Unit LED Display

HAP ◑ H1P — H2P —

Applicable Models

FDY-K models

Method of Malfunction Detection

Check data from E^{2}PROM.

Malfunction Decision Conditions

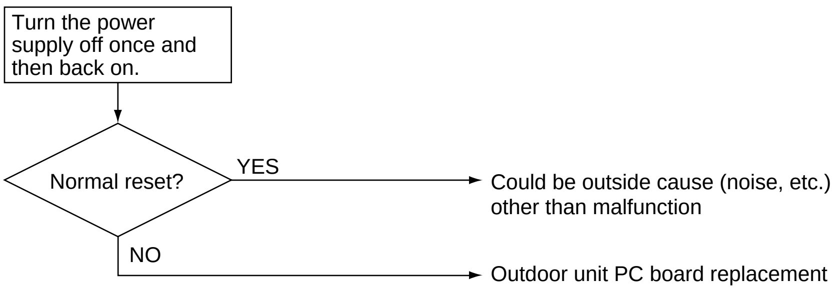
E^{2}PROM
When the power is ON, malfunction is confirmed by E^{2}PROM failure.

Supposed Causes

- Failure of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1374)

6.10 High Pressure System (HPS) Malfunction

Remote Controller Display

E3

Outdoor Unit LED Display

HAP ◑ H1P ☼ H2P ●

Applicable Models

RY

Method of Malfunction Detection

Continuity of the high pressure switch is detected by the safety device circuitry.

Malfunction Decision Conditions

Case where high pressure switch is actuated when the compressor is operating

Supposed Causes

<Causes related to PC board>

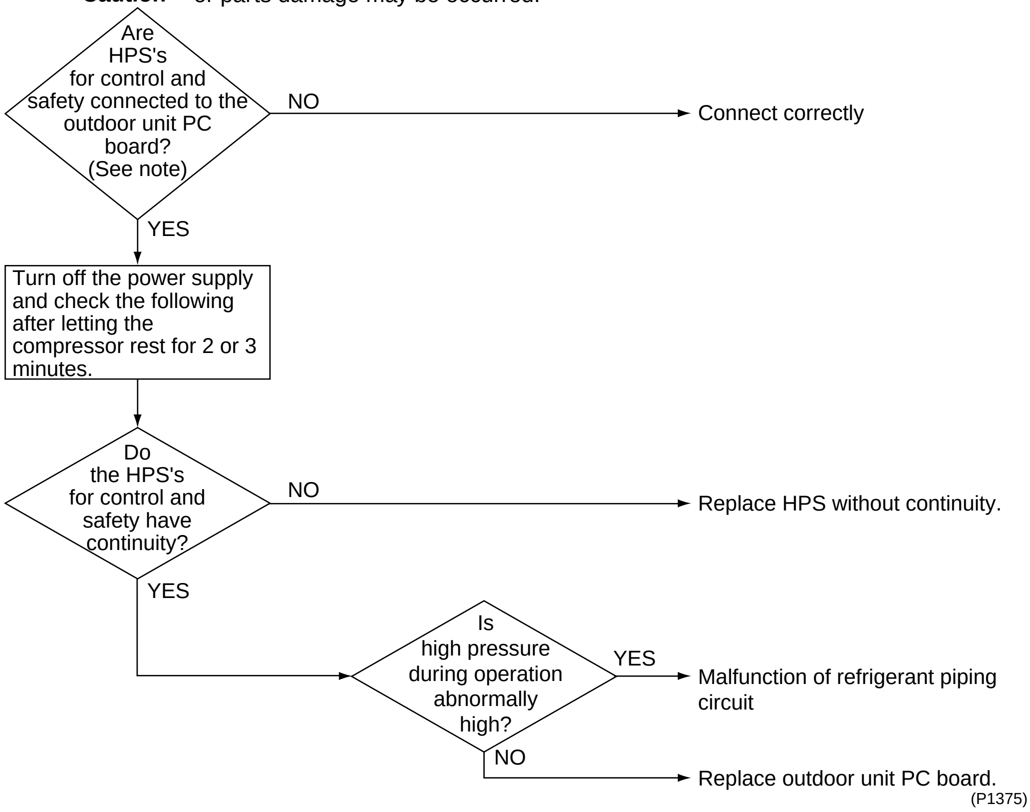
- Failure of high pressure switch
- High pressure switch’s harness is broken or disconnected
- Failure of high pressure switch’s connector connection
- Failure of outdoor unit PC board

<Causes related to product as a whole>

- Malfunction of refrigerant piping circuit

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



Note: Some models are not equipped with an HPS for control.

6.11 Low Pressure System (LPS) Malfunction

Remote Controller Display

E4

Outdoor Unit LED Display

HAP ◐ H1P ☼ H2P ●

Applicable Models

RY

Method of Malfunction Detection

Continuity of the low pressure switch is detected by the safety device circuitry.

Malfunction Decision Conditions

Case where low pressure switch is actuated when the compressor is operating

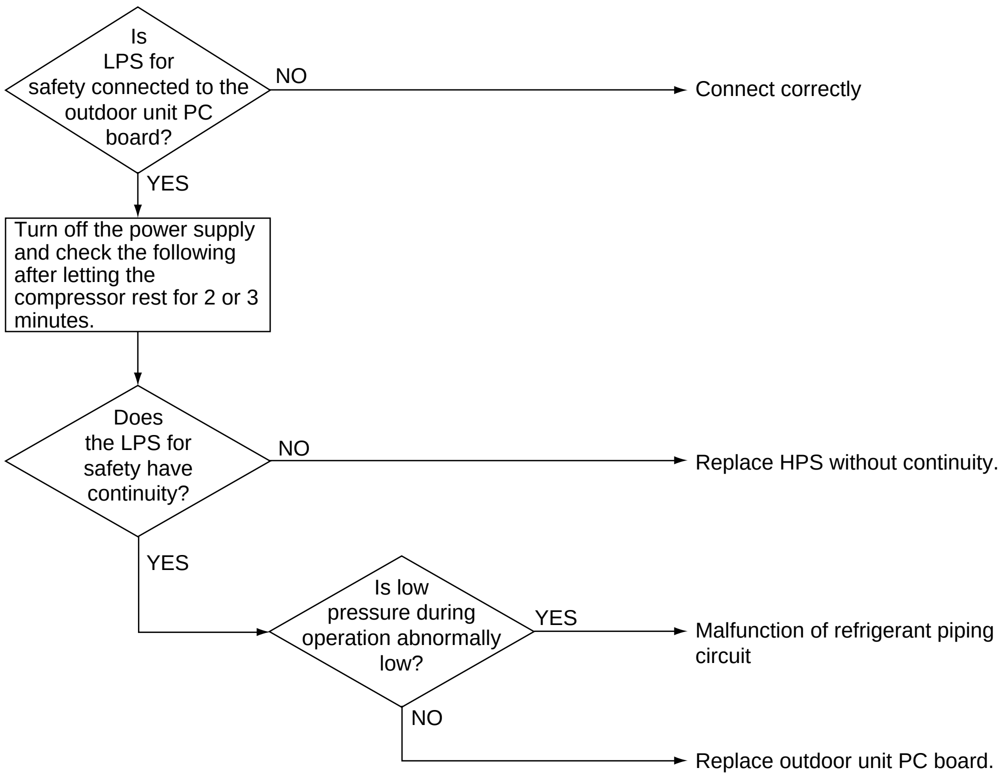
Supposed Causes

<Causes related to PC board>
- Failure of low pressure switch
- Low pressure switch’s harness is broken or disconnected
- Failure of low pressure switch’s connector connection
- Failure of outdoor unit PC board

<Causes related to product as a whole>
- Malfunction of refrigerant piping circuit

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1376)

6.12 Malfunction of Electronic Expansion Valve

Remote Controller Display

E9

Outdoor Unit LED Display

HAP ◑ H1P ● H2P ●

Applicable Models

RY140KU only

Method of Malfunction Detection

With electronic expansion valve malfunction detection, coil current is detected and open and short circuits are detected.

Malfunction Decision Conditions

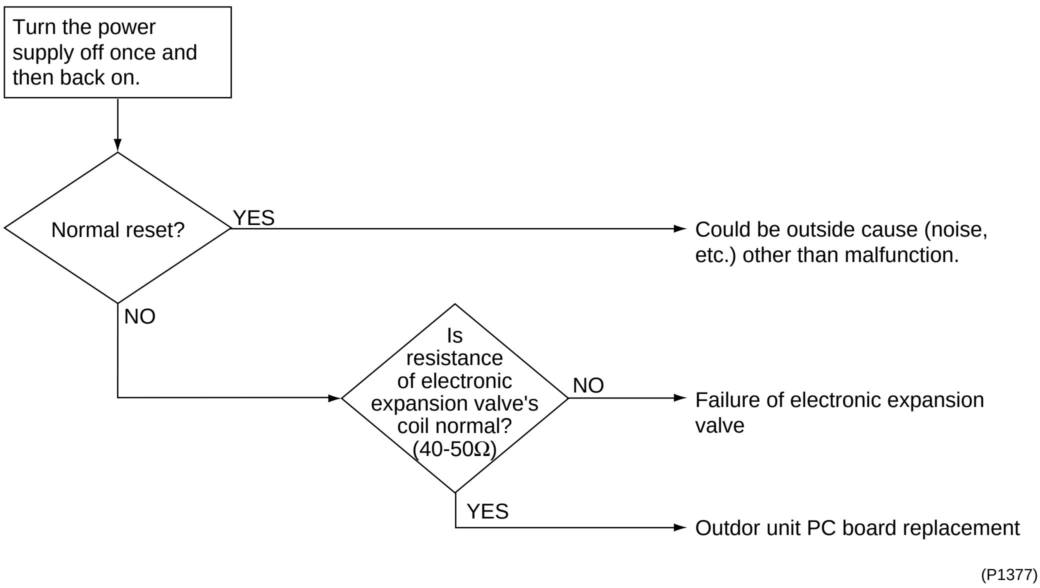
Malfunction is determined by the following condition.
Coil current: open circuit < normal < short circuit

Supposed Causes

- Failure of electronic expansion valve
- Electronic expansion valve’s harness is broken or disconnected.
- Failure of electronic expansion valve’s connector connection
- Failure of outdoor unit PC board
- Outside cause (noise, etc.)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



6.13 Discharge Pipe Temperature Malfunction

Remote Controller Display

F3

Outdoor Unit LED Display

HAP ◐ H1P ● H2P ●

Applicable Models

RY140KU only

Method of Malfunction Detection

Malfunction is detected according to temperature detected by discharge pipe temperature sensor.

Malfunction Decision Conditions

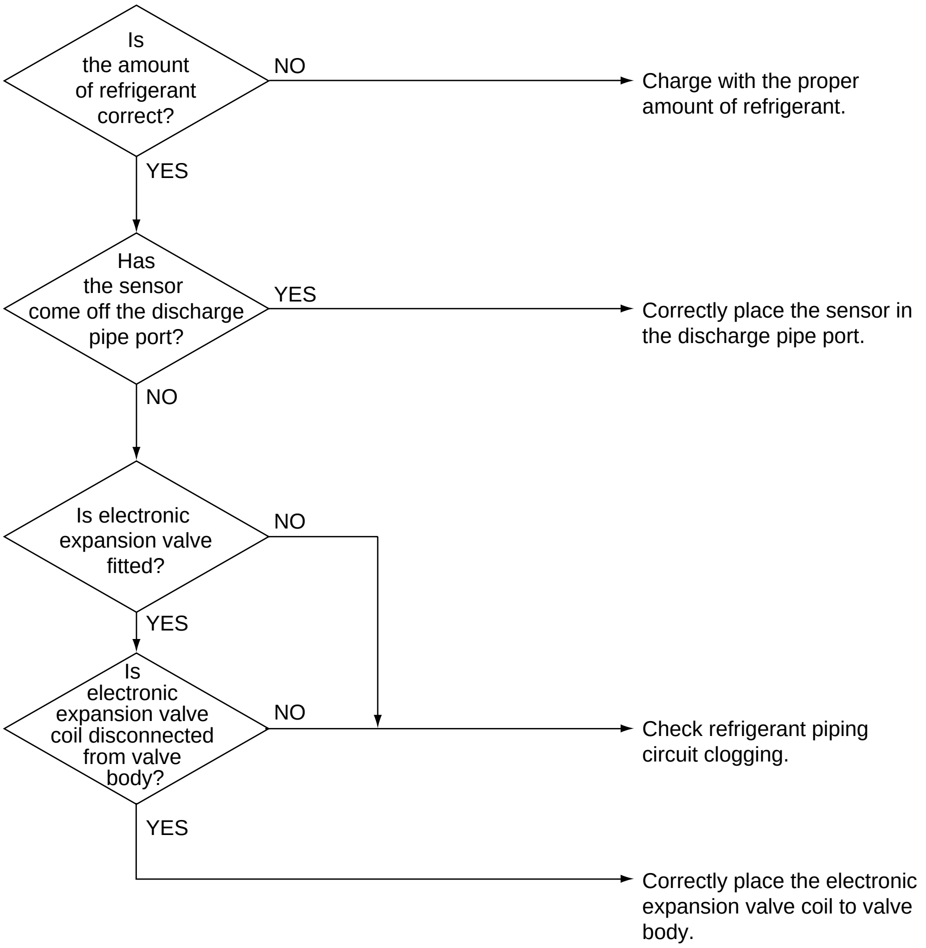
- When discharge pipe temperature becomes abnormally high
- When discharge pipe temperature rises suddenly
- When the discharge pipe sensor comes out of its installed position

Supposed Causes

- Improper amount of refrigerant
- Refrigerant piping circuit clogging

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1378)

6.14 Malfunction of High Pressure Switch

Remote Controller Display

H3

Outdoor Unit LED Display

HAP ◑ H1P ☼ H2P ☼

Applicable Models

RY

Method of Malfunction Detection

Continuity of the high pressure switch is detected by the safety device circuitry.

Malfunction Decision Conditions

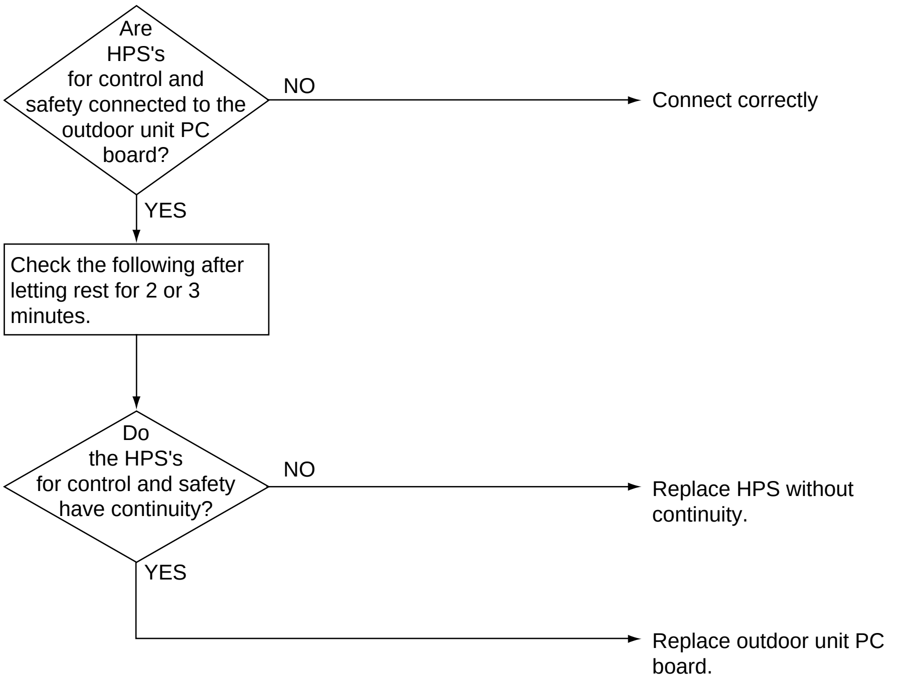
When the compressor is off and the high pressure switch doesn’t have continuity

Supposed Causes

- Failure of high pressure switch
- High pressure switch’s harness is broken or disconnected
- Failure of high pressure switch’s connector connection
- Failure of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1379)

6.15 Malfunction of Low Pressure Switch

Remote Controller Display

H4

Outdoor Unit LED Display

HAP ◐ H1P ☼ H2P ☼

Applicable Models

RY

Method of Malfunction Detection

Continuity of the low pressure switch is detected by the safety device circuitry.

Malfunction Decision Conditions

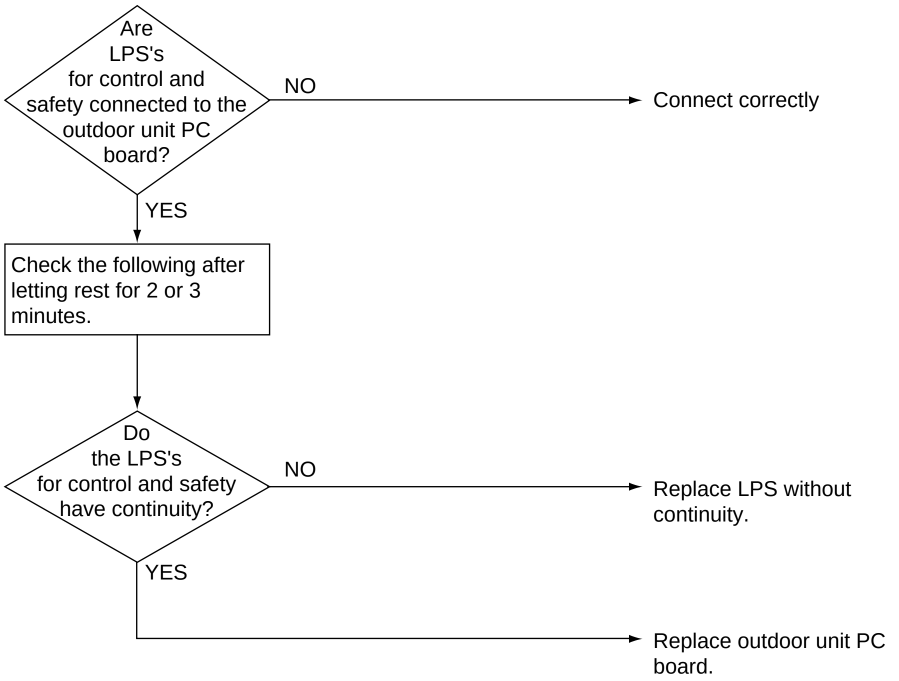
When the compressor is off and the low pressure switch doesn't have continuity

Supposed Causes

- Failure of low pressure switch
- Low pressure switch's harness is broken or disconnected
- Failure of low pressure switch's connector connection
- Failure of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1380)

6.16 Malfunction of Outdoor Temperature Sensor System

Remote Controller Display

H9

Outdoor Unit LED Display

HAP ◑ H1P ☼ H2P ☼

Applicable Models

R(Y)

Malfunction Decision Conditions

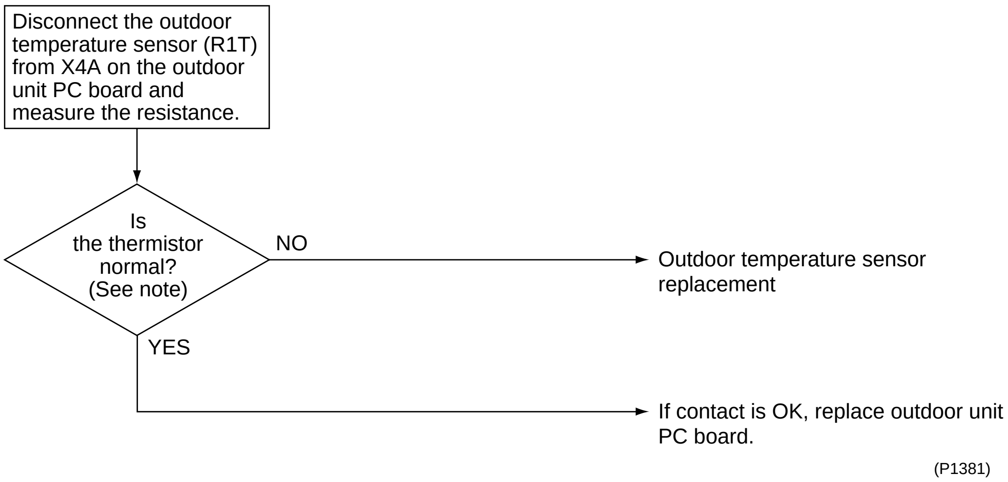
Case where the outdoor temperature sensor has a short or open circuit

Supposed Causes

- Failure of outdoor temperature sensor
- Failure of outdoor temperature sensor's connector connection
- Failure of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



Note: Measure the resistance while referring to the thermistor temperature and resistance conversion table. Refer to page 181.

6.17 Malfunction of Discharge Pipe Temperature Sensor System

Remote Controller Display

J3

Outdoor Unit LED Display

HAP ◐ H1P ☼ H2P ☼

Applicable Models

RY140KU only

Malfunction Decision Conditions

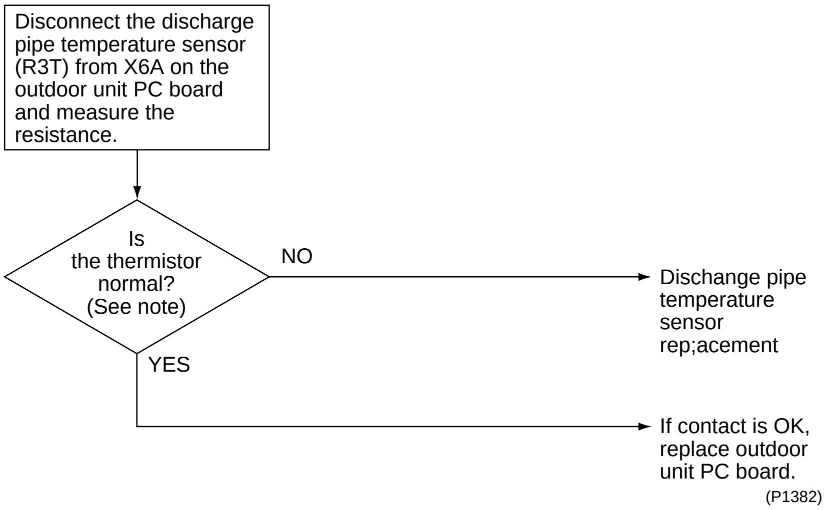
Case where the discharge pipe temperature sensor has a short or open circuit

Supposed Causes

- Failure of discharge pipe temperature sensor
- Failure of discharge pipe temperature sensor's connector connection
- Failure of outdoor unit PC board

Troubleshooting

⚠ **Caution** Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



Note: Measure the resistance while referring to the thermistor temperature and resistance conversion table. Refer to page 181.

6.18 Malfunction of Heat Exchanger Temperature Sensor System

Remote Controller Display

J6

Outdoor Unit LED Display

HAP ◐ H1P ☼ H2P ☼

Applicable Models

R(Y)

Malfunction Decision Conditions

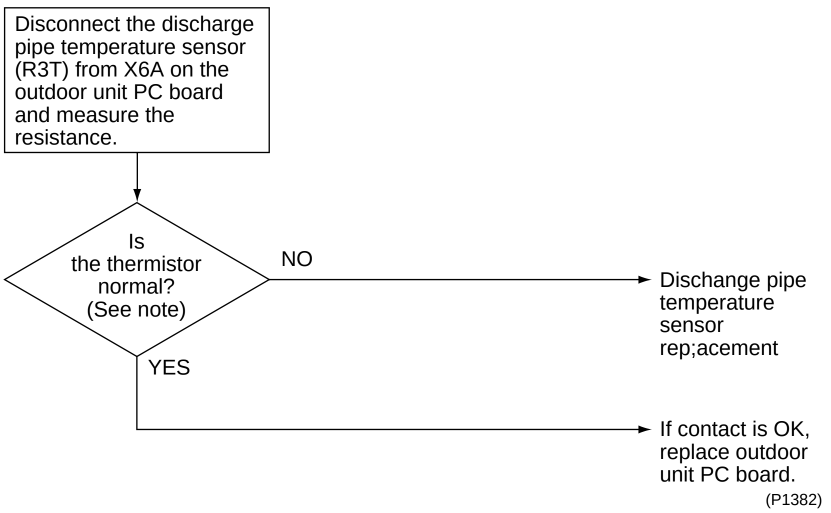
Case where the heat exchanger temperature sensor has a short or open circuit

Supposed Causes

- Failure of heat exchanger sensor
- Failure of heat exchanger sensor's connector connection
- Failure of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



Note: Measure the resistance while referring to the thermistor temperature and resistance conversion table. Refer to page 181.

6.19 Short of Gas Malfunction

Remote Controller Display

U0

LED Display

HAP — H1P — H2P —

Applicable Models

RY140KU only

Method of Malfunction Detection

Lack of gas is detected according to discharge pipe temperature.

Malfunction Decision Conditions

Microcomputer decides whether there is a lack of gas and detects malfunction.

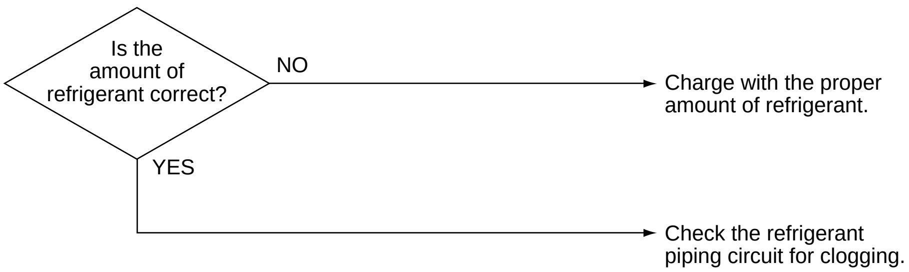
- Stop due to malfunction does not occur even though a malfunction is determined to have occurred.

Supposed Causes

- Lack of refrigerant
- Refrigerant piping circuit clogging

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1384)

6.20 Reverse Phase

Remote Controller Display

U1

Outdoor Unit LED Display

HAP ◐ H1P ● H2P ☼

Applicable Models

RY

Method of Malfunction Detection

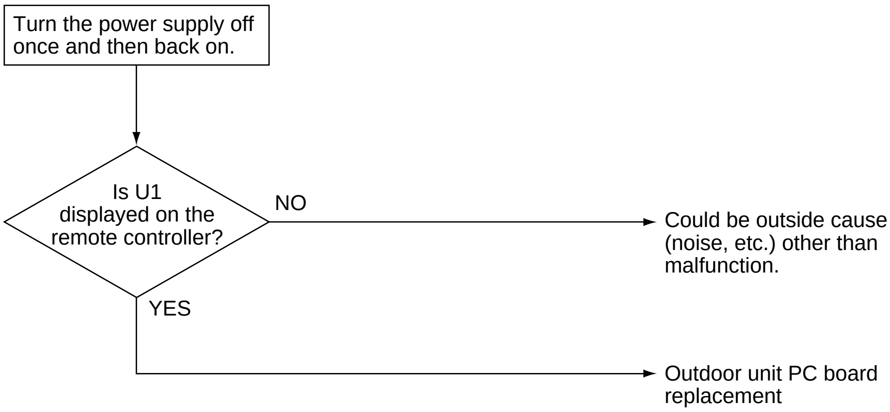
Reverse phase detection circuit detects the phase of each phase and determines whether it is normal or reverse phase.

Supposed Causes

- Failure of power supply wiring connection
- Power supply wiring is broken or disconnected.
- Failure of outdoor unit PC board

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.

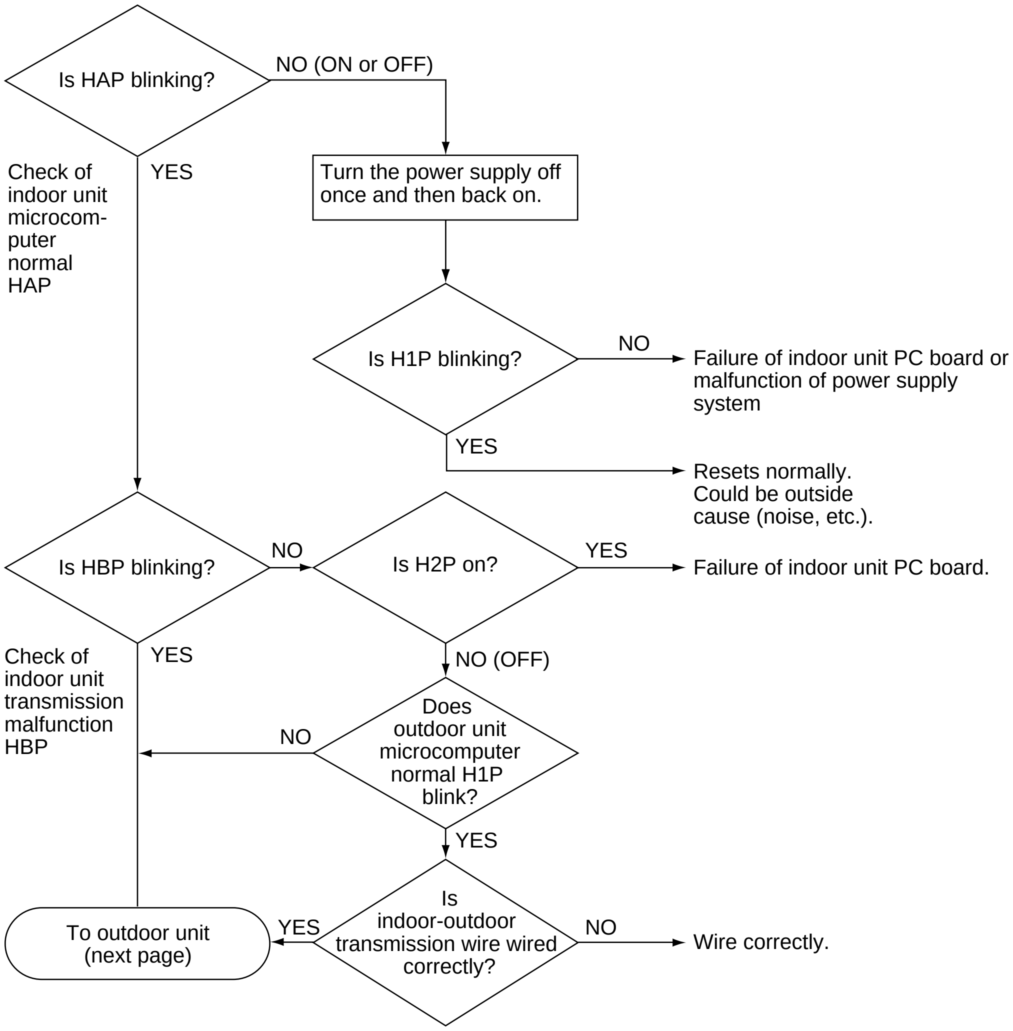


(P1385)

6.21 Malfunction of Transmission (Between Indoor and Outdoor Unit)

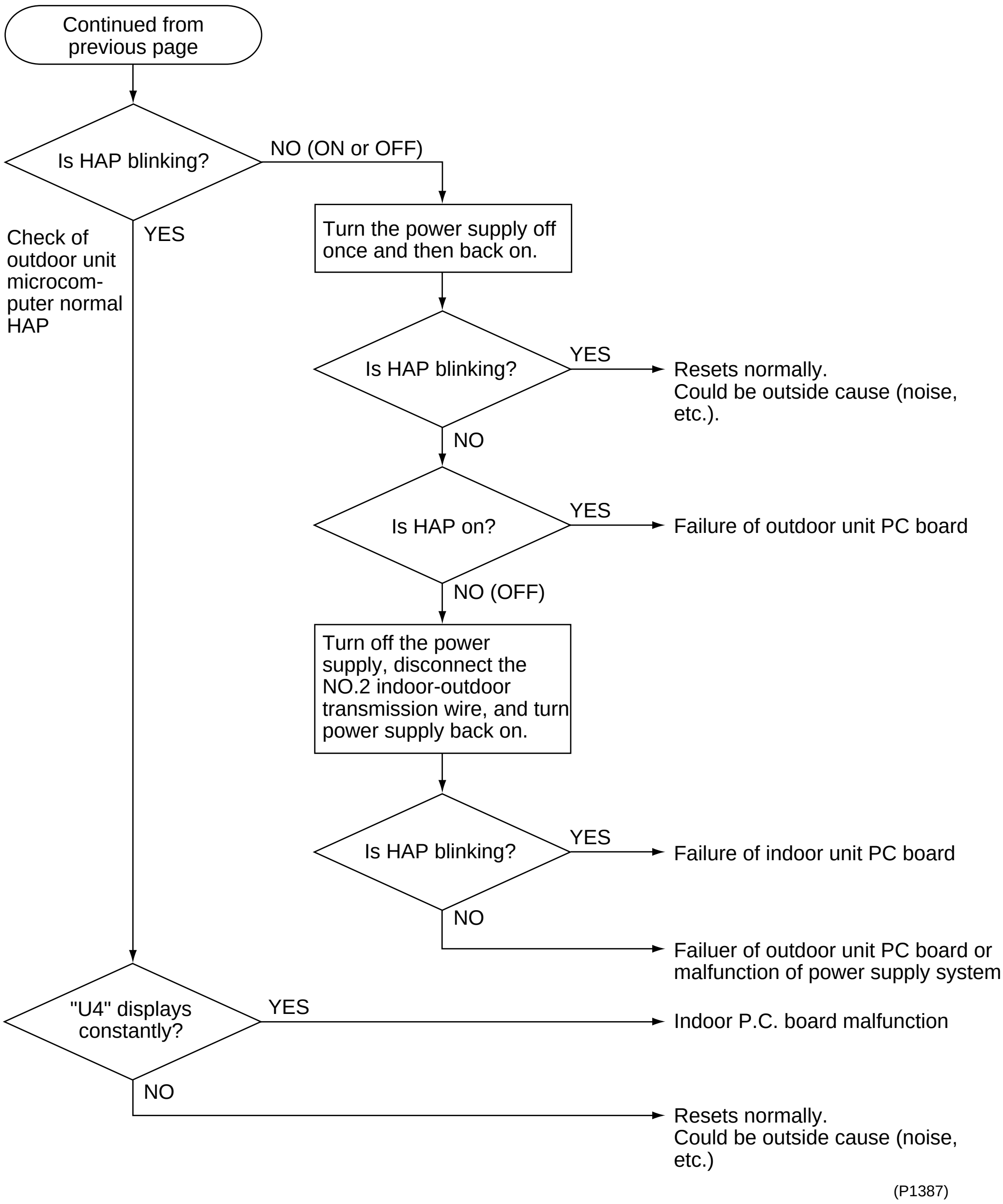
Remote Controller Display	U4 or UF
LED Display	HAP — H1P — H2P —
Applicable Models	RY
Method of Malfunction Detection	Microcomputer checks if transmission between indoor and outdoor units is normal.
Malfunction Decision Conditions	When transmission is not carried out normally for a certain amount of time
Supposed Causes	■ Wiring indoor-outdoor transmission wire is incorrect. ■ Failure of indoor unit PC board ■ Failure of outdoor unit PC board ■ Outside cause (noise, etc.)
Troubleshooting 1	Diagnosis of incorrect or broken/disconnected wiring If the LEDs on the indoor unit PC board are off, it indicates that the transmission wiring between indoor and outdoor units may be incorrect or broken/disconnected.

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1386)

Troubleshooting 2



6.22 Malfunction of Transmission (Between Indoor Unit and Remote Controller)

Remote Controller Display

U5

LED Display

HAP — H1P — H2P —

Applicable Models

RY

Method of Malfunction Detection

Microcomputer checks if transmission between indoor unit and remote controller is normal.

Malfunction Decision Conditions

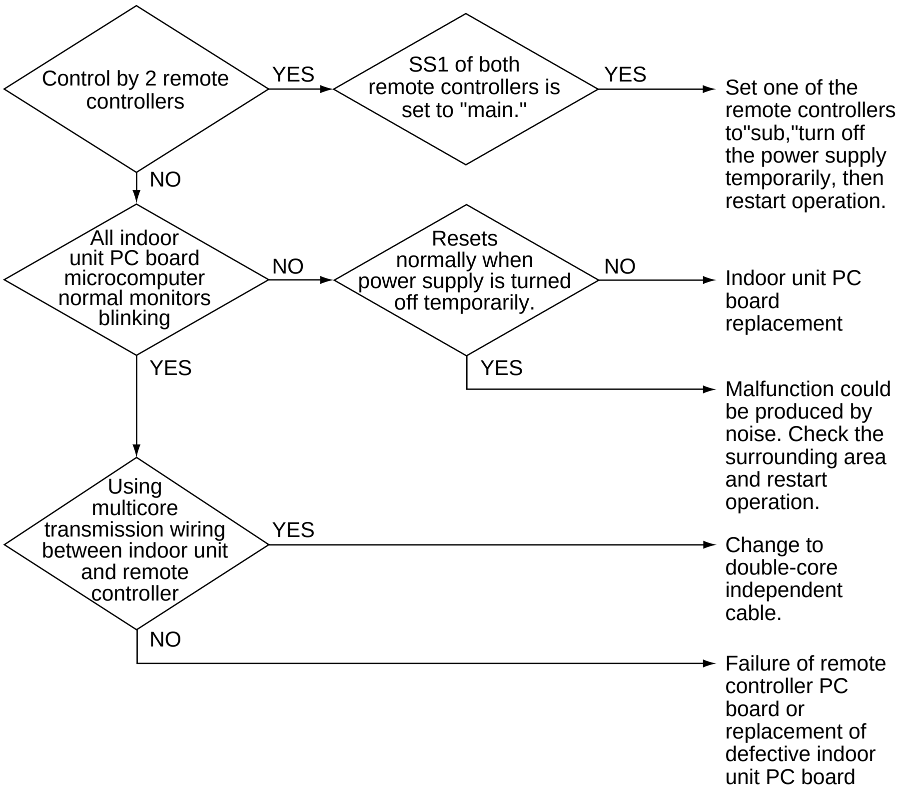
When transmission is not carried out normally for a certain amount of time

Supposed Causes

- Failure of remote controller
- Failure of indoor PC board
- Outside cause (noise, etc.)
- Connection of 2 master remote controllers (When using 2 remote controllers)

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1388)

6.23 Transmission Error Between Main Remote Controller and Sub Remote Controller

Remote Controller Display

U8

LED Display

HAP — H1P — H2P —

Applicable Models

All models of indoor unit

Method of Malfunction Detection

In case of controlling with 2- remote controller, check the system using microcomputer if signal transmission between indoor unit and remote controller (main and sub) is normal.

Malfunction Decision Conditions

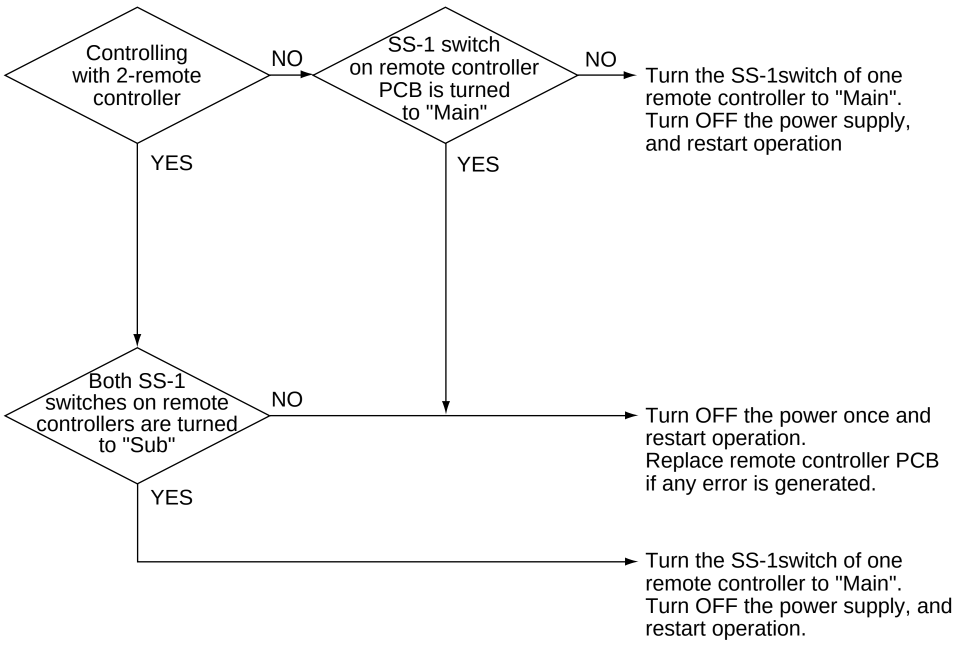
Normal transmission does not continue for specified period.

Supposed Causes

- Transmission error between Main remote controller and Sub remote controller
- Connection among “Sub” remote controllers
- Faulty remote controller PCB

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



(P1389)

6.24 Failure of Field Setting Switch

Remote Controller Display

UA

LED Display

HAP — H1P — H2P —

Applicable Models

Standard models

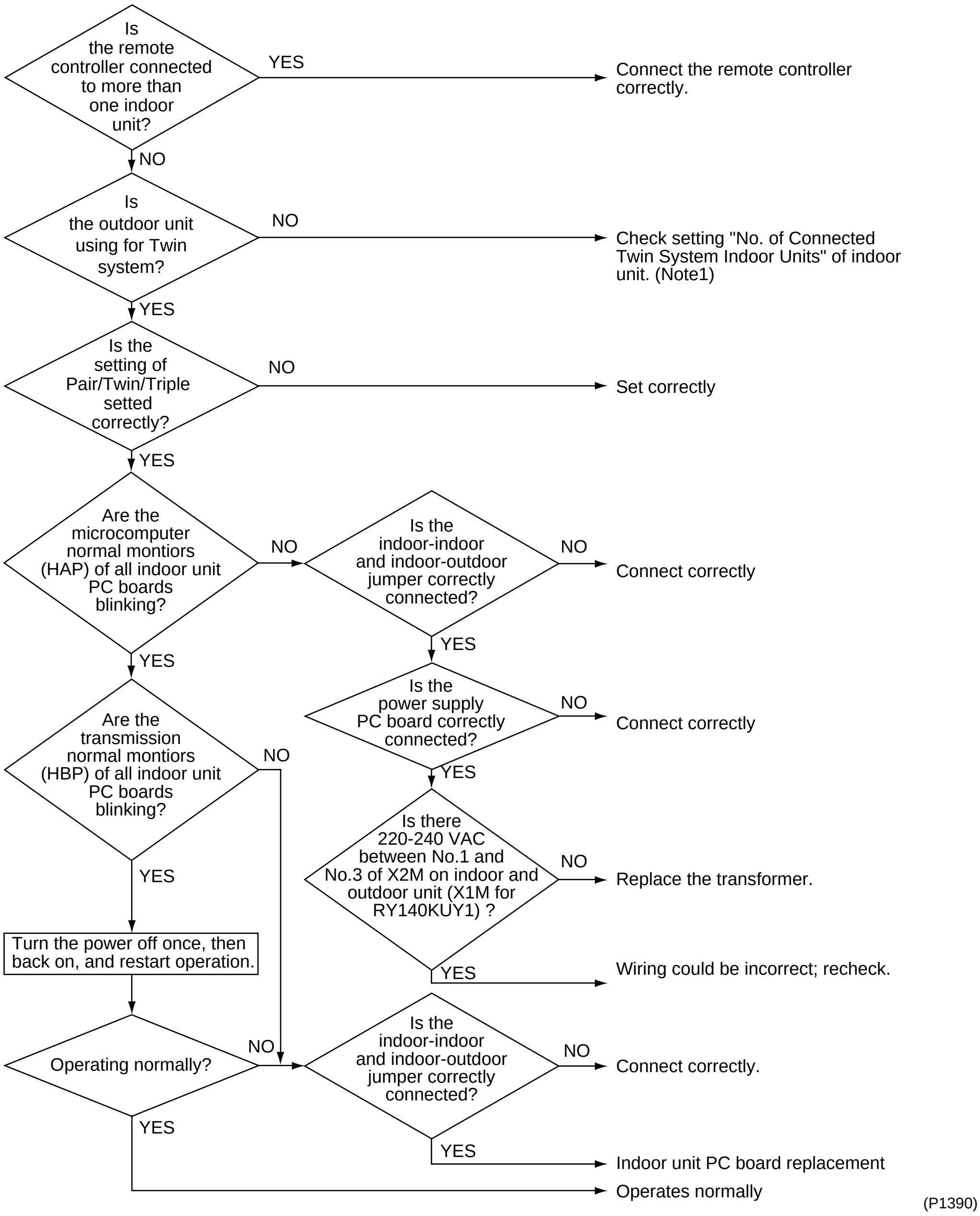
Supposed Causes

<common>

- Failure of indoor or outdoor unit PC board
- Failure of power supply PC board
- Indoor-outdoor, indoor-indoor unit transmission wiring
- Failure of remote controller wiring

Troubleshooting

Caution Be sure to turn off power switch before connect or disconnect connector, or parts damage may be occurred.



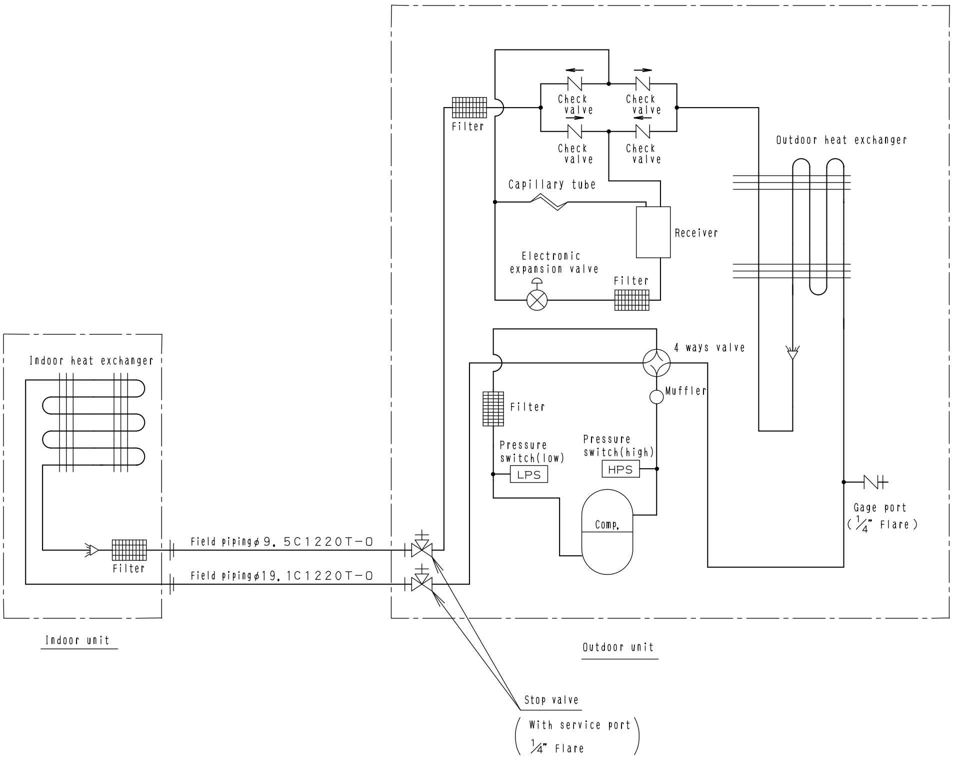
Part 9
Appendix

1. Piping Diagrams

1.1 Indoor / Outdoor Units

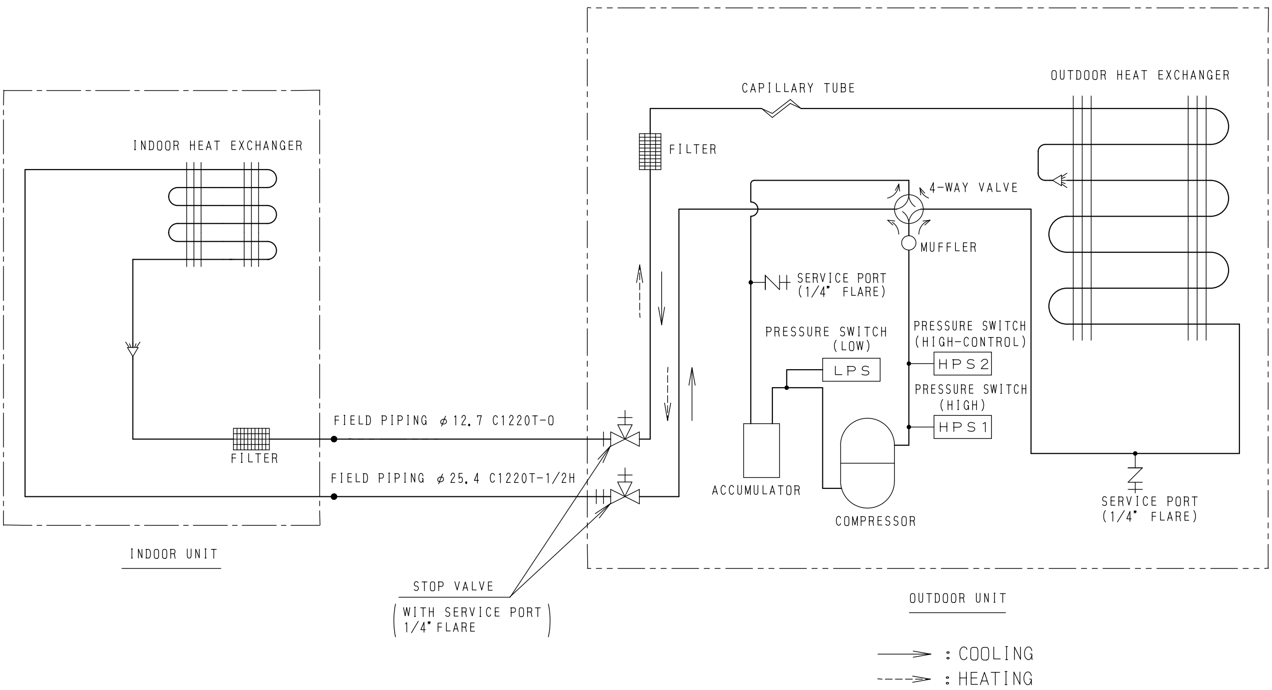
1.1.1 50Hz

FDY06K(A)Y1 + RY140KUY1



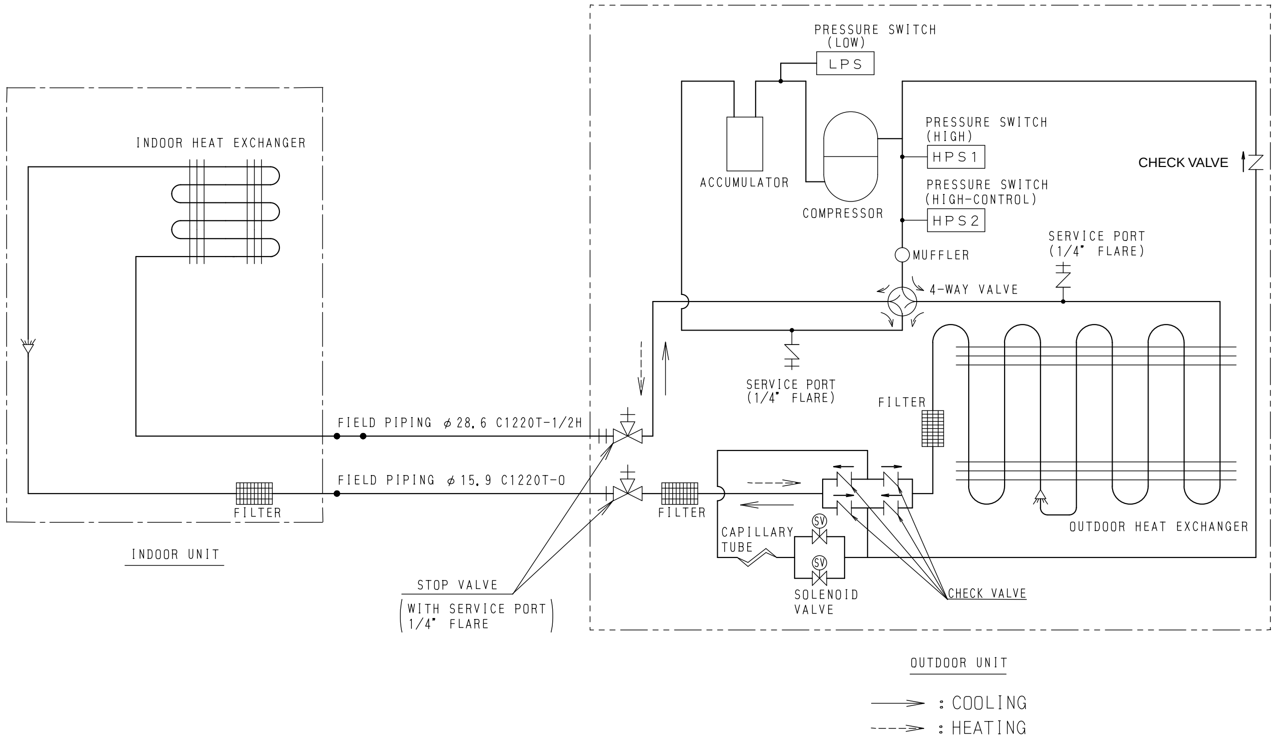
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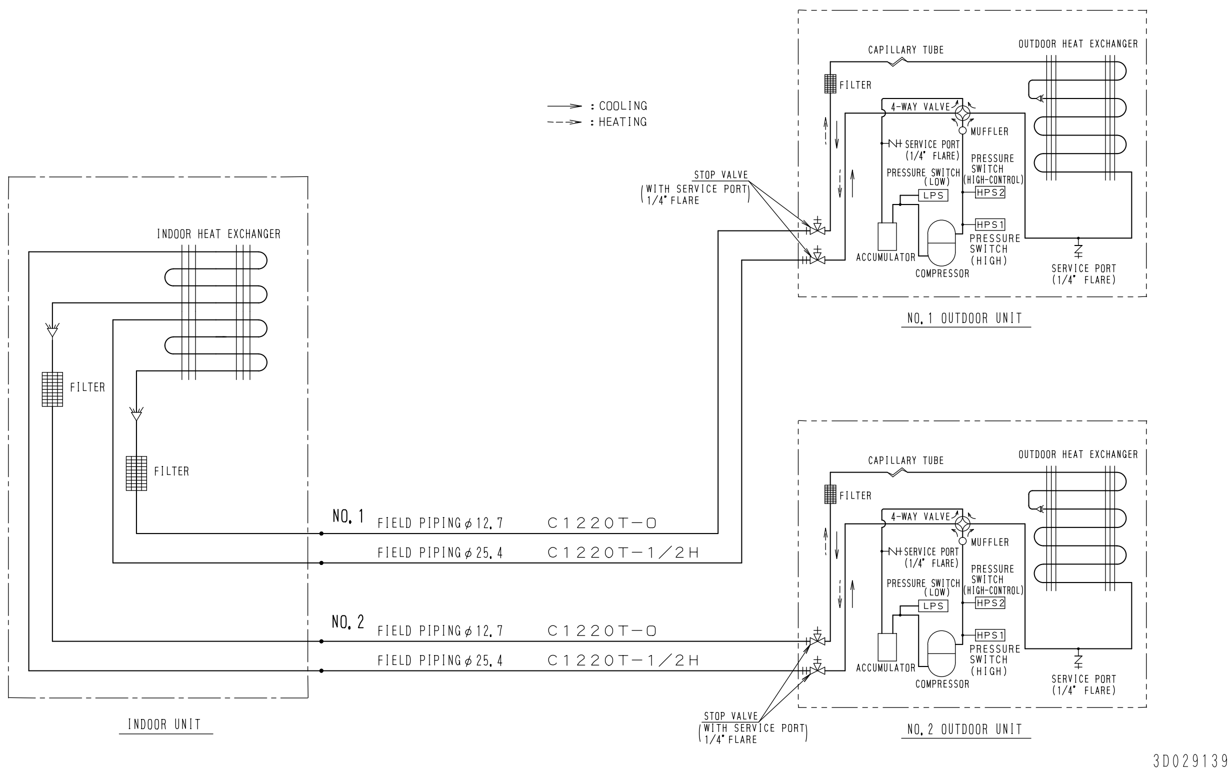
3D029822

FDY10K(A)Y1 + RY250KUY1

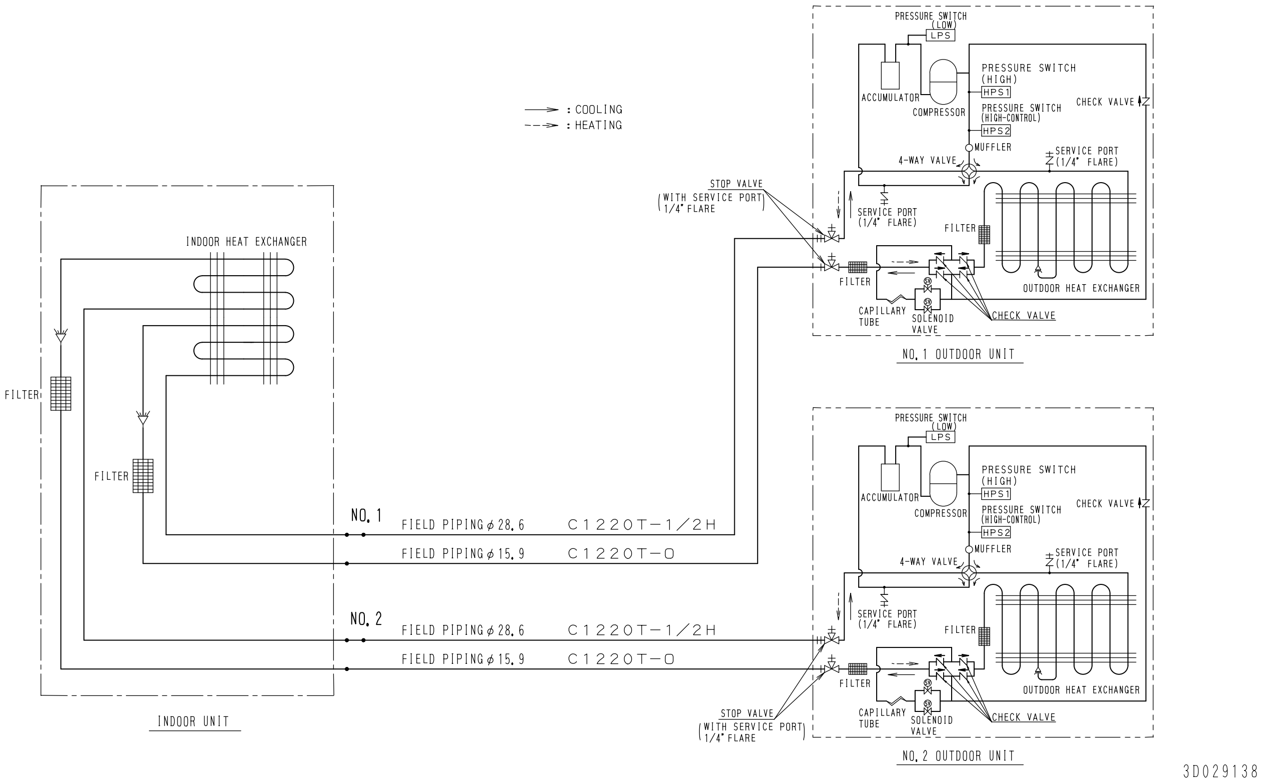


C : 3D029826

FDY15K(A)Y1 + RY200KUY1×2

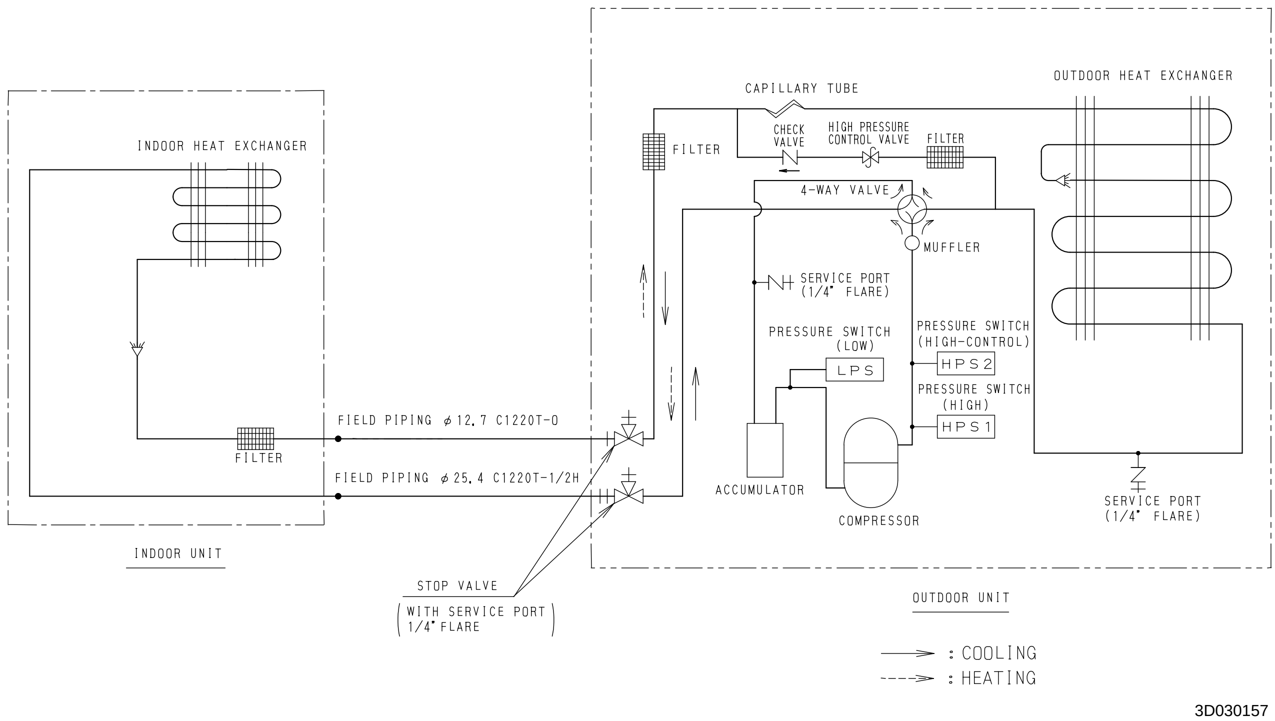


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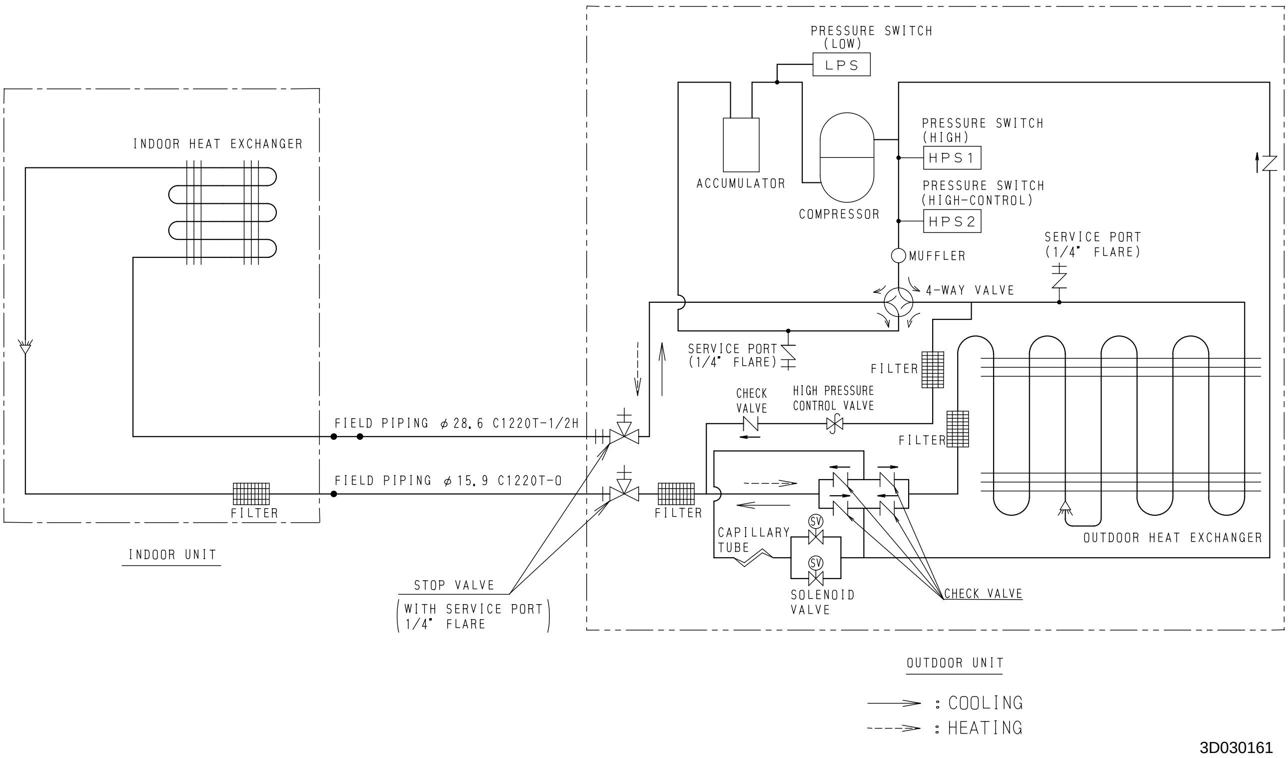


1.1.2 60Hz

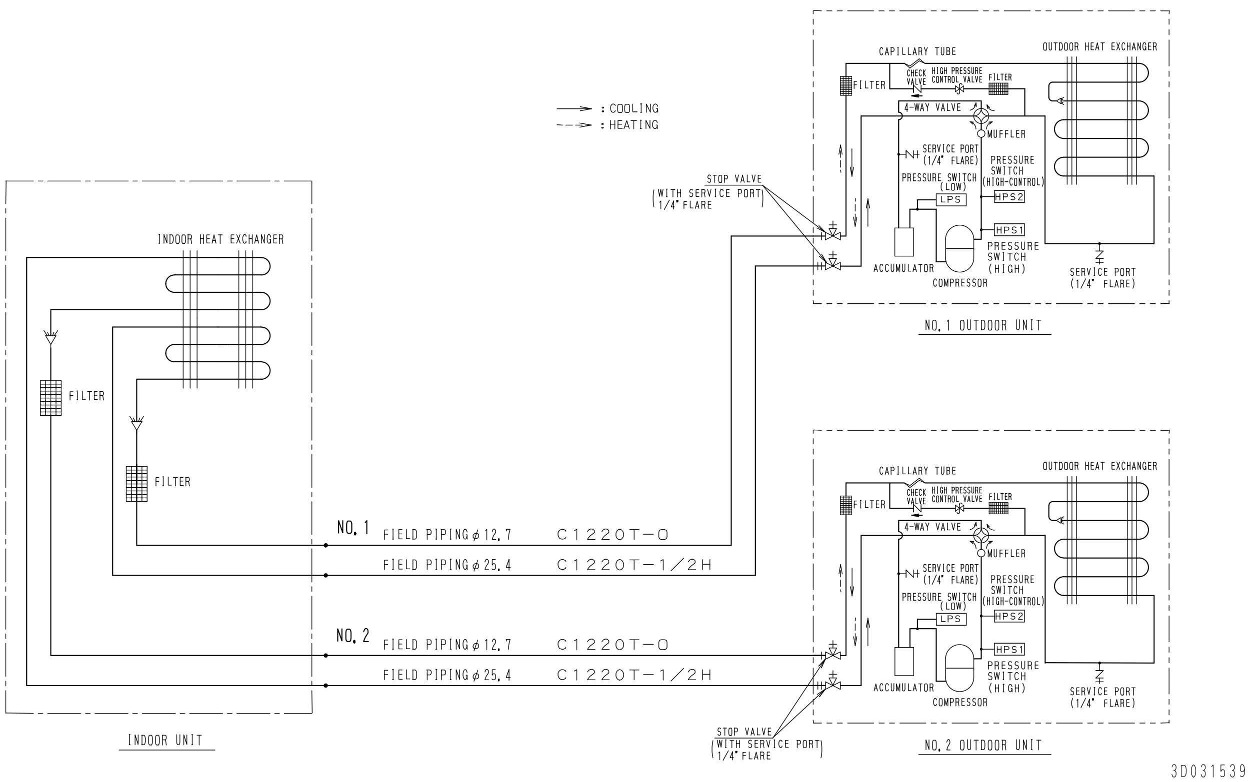
FDY08K(A)TAL + RY200KUTAL
FDY08K(A)YAL + RY200KUYAL



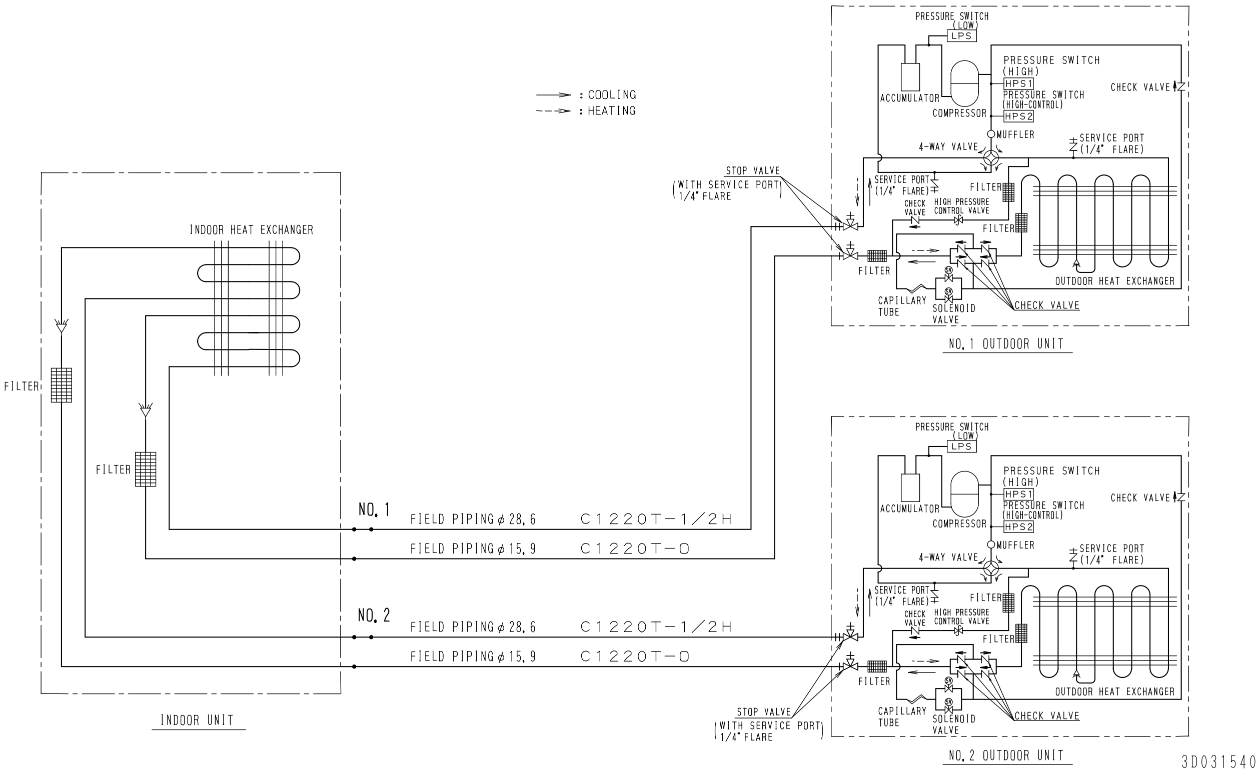
FDY10K(A)TAL + RY250KUTAL
FDY10K(A)YAL + RY250KUYAL



FDY15K(A)TAL + RY200KUTAL×2
FDY15K(A)YAL + RY200KUYAL×2



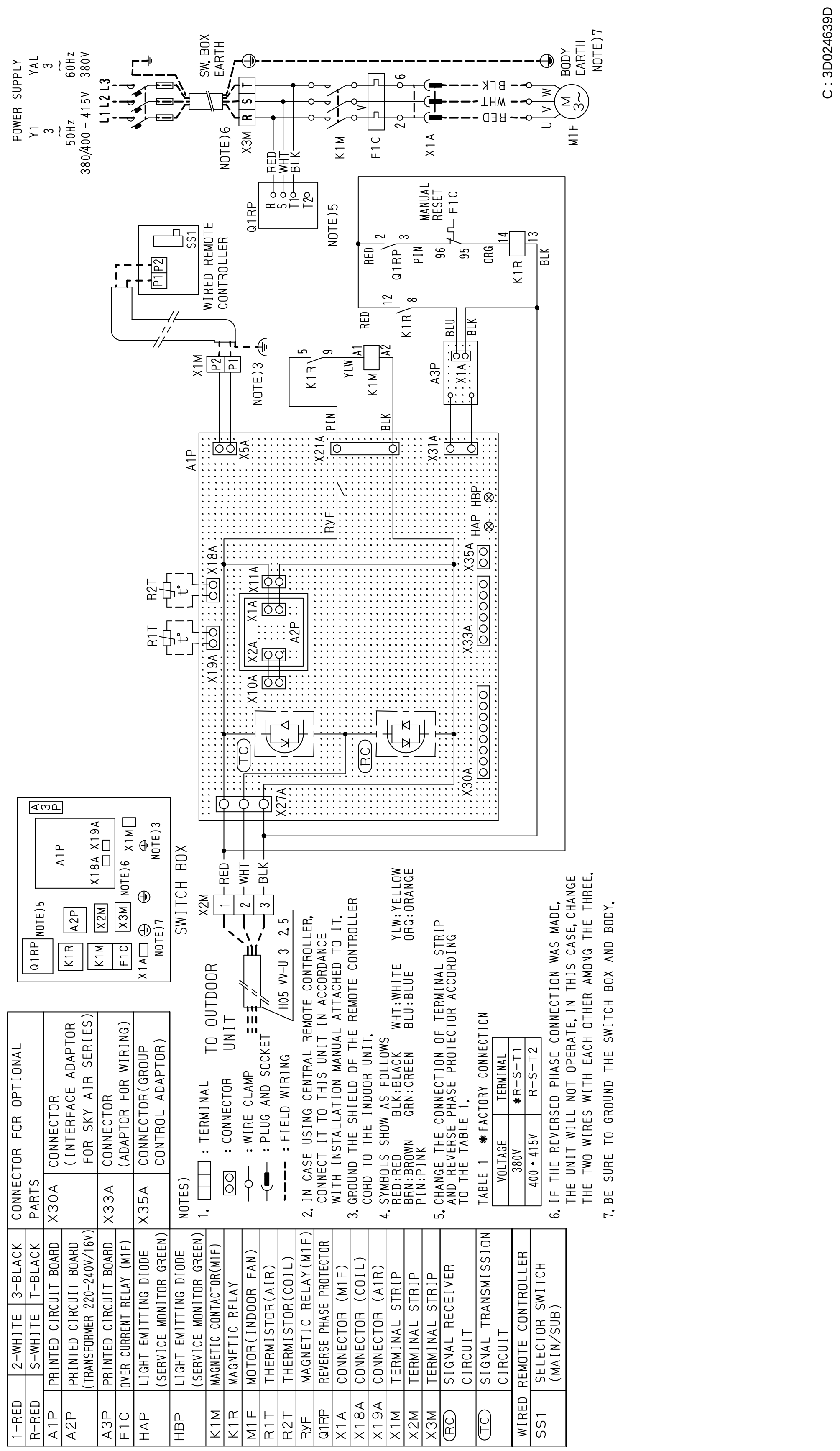
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FDY20K(A)YAL + RY250KUYAL×2



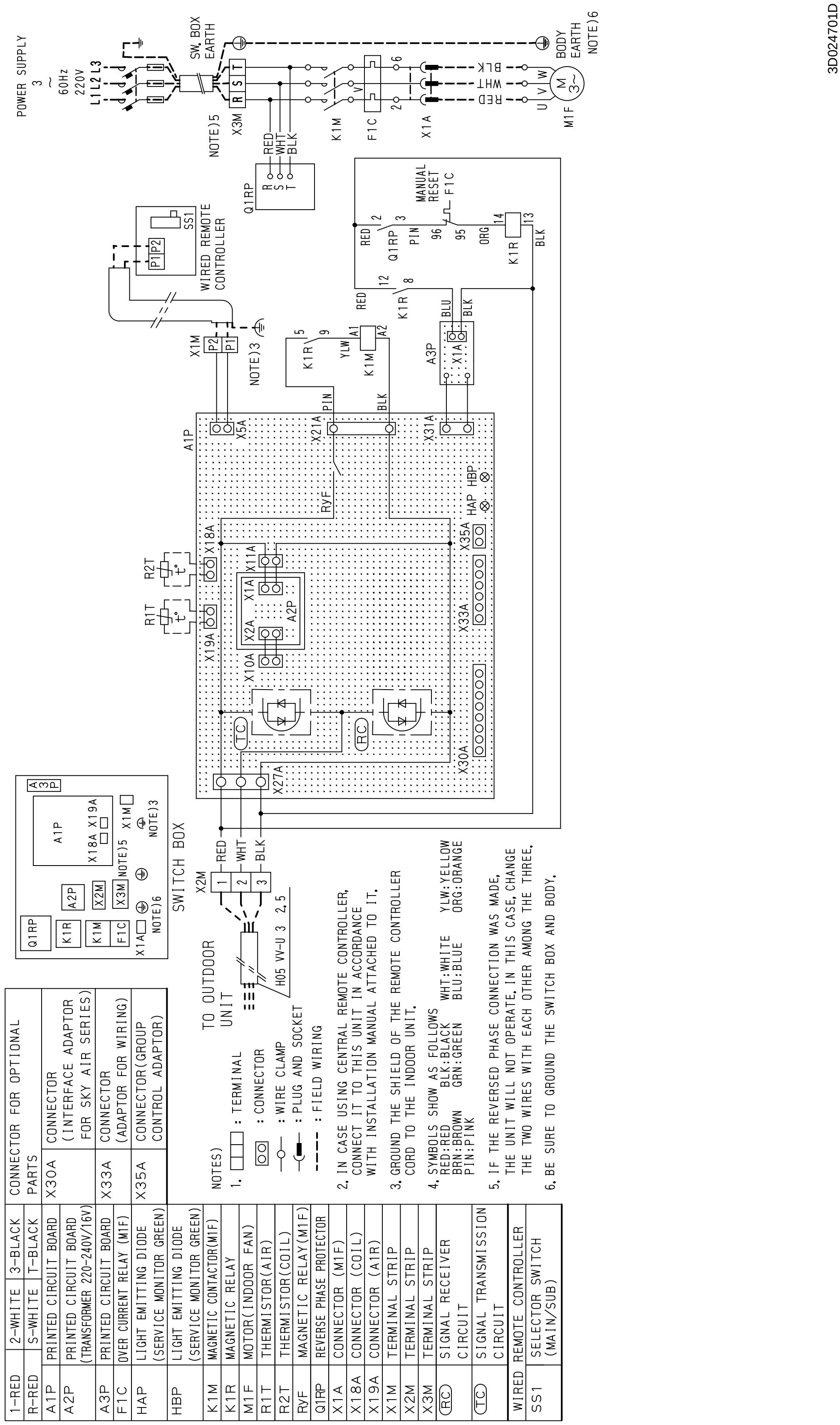
2. Wiring Diagrams

2.1 Indoor Units FDY-K Model

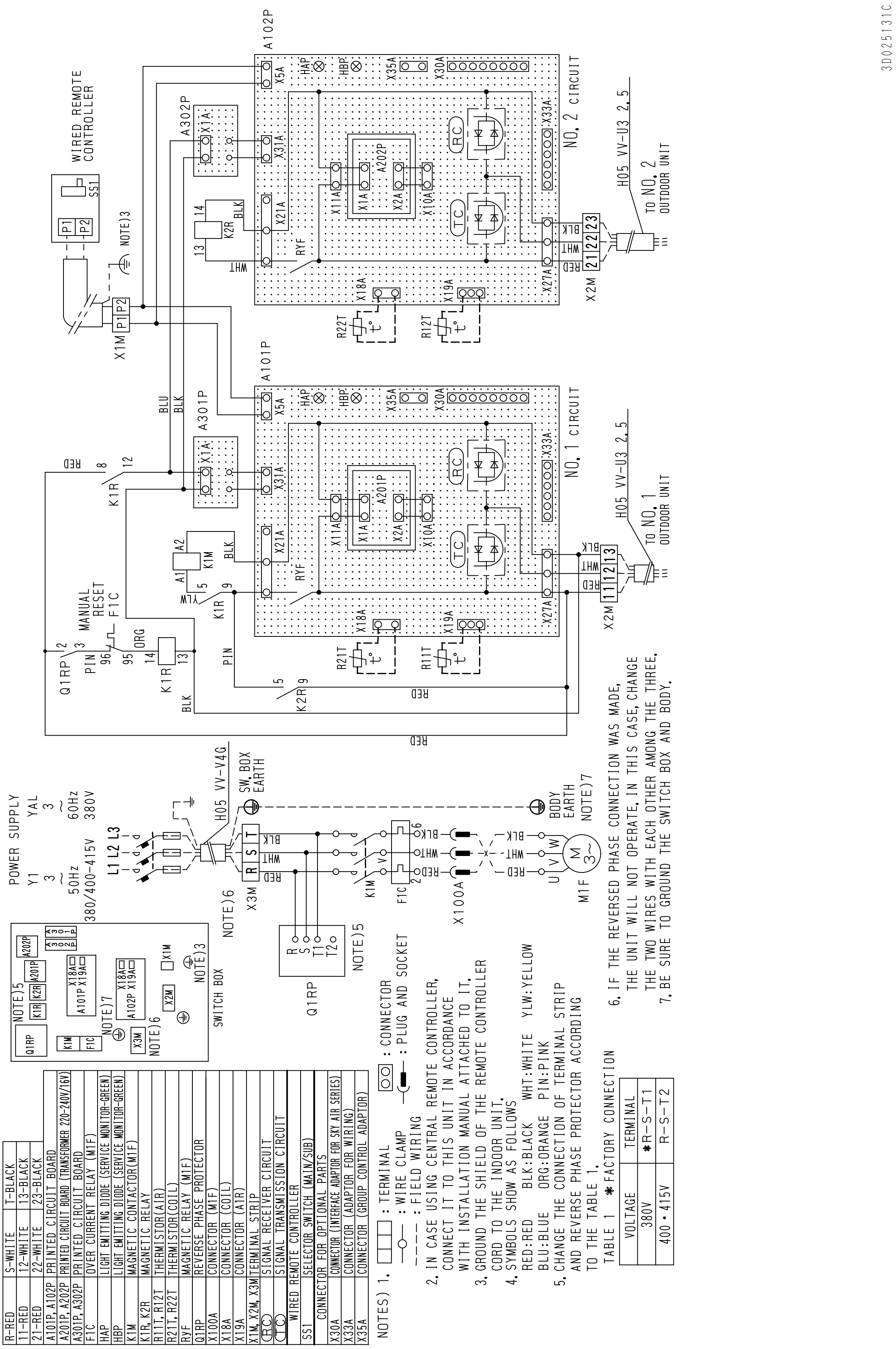
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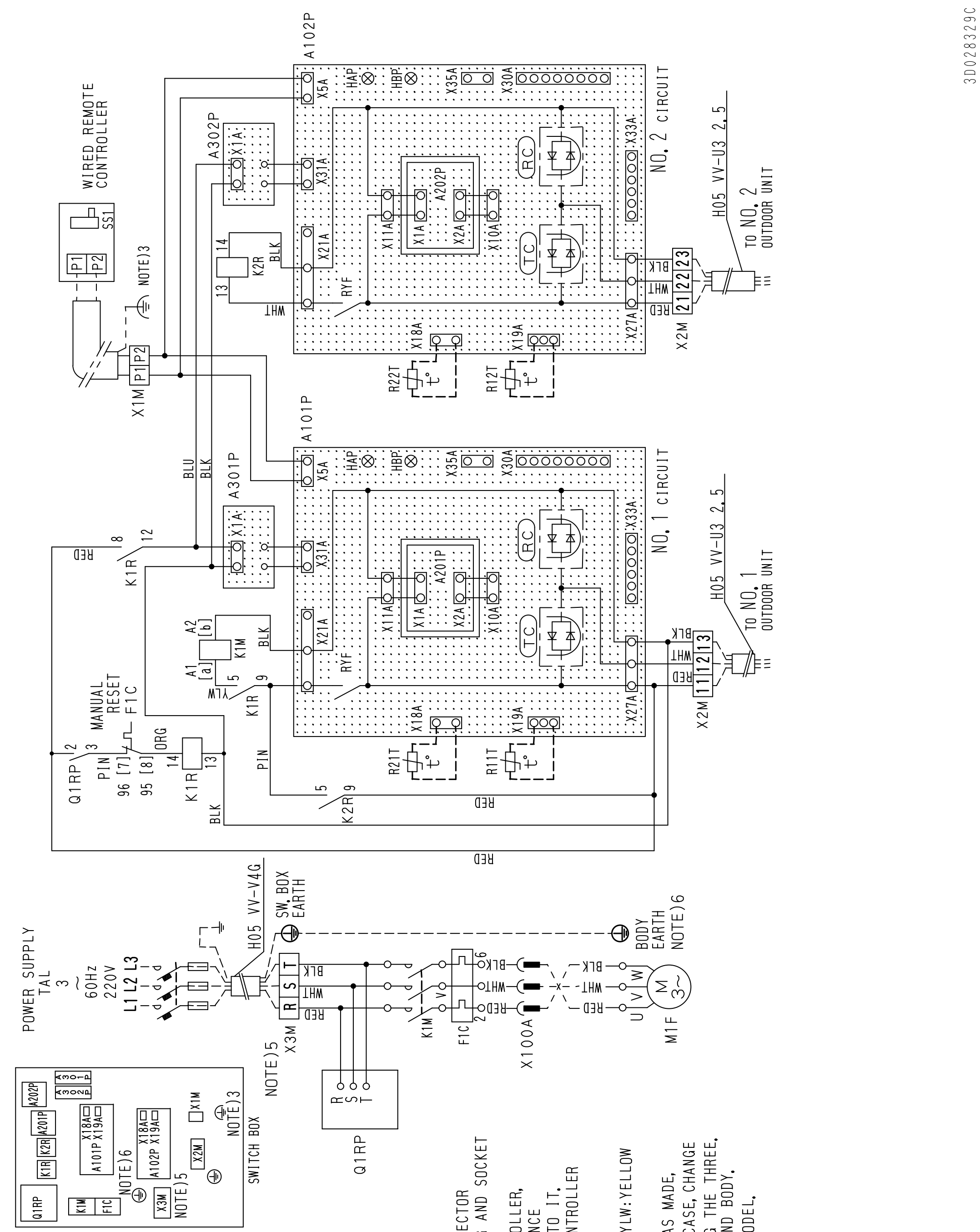
FDY08KTAL / FDY10KTAL



FDY15KY1 / FDY20KY1 / FDY15KYAL / FDY20KYAL



FDY15KTAL / FDY20KTAL

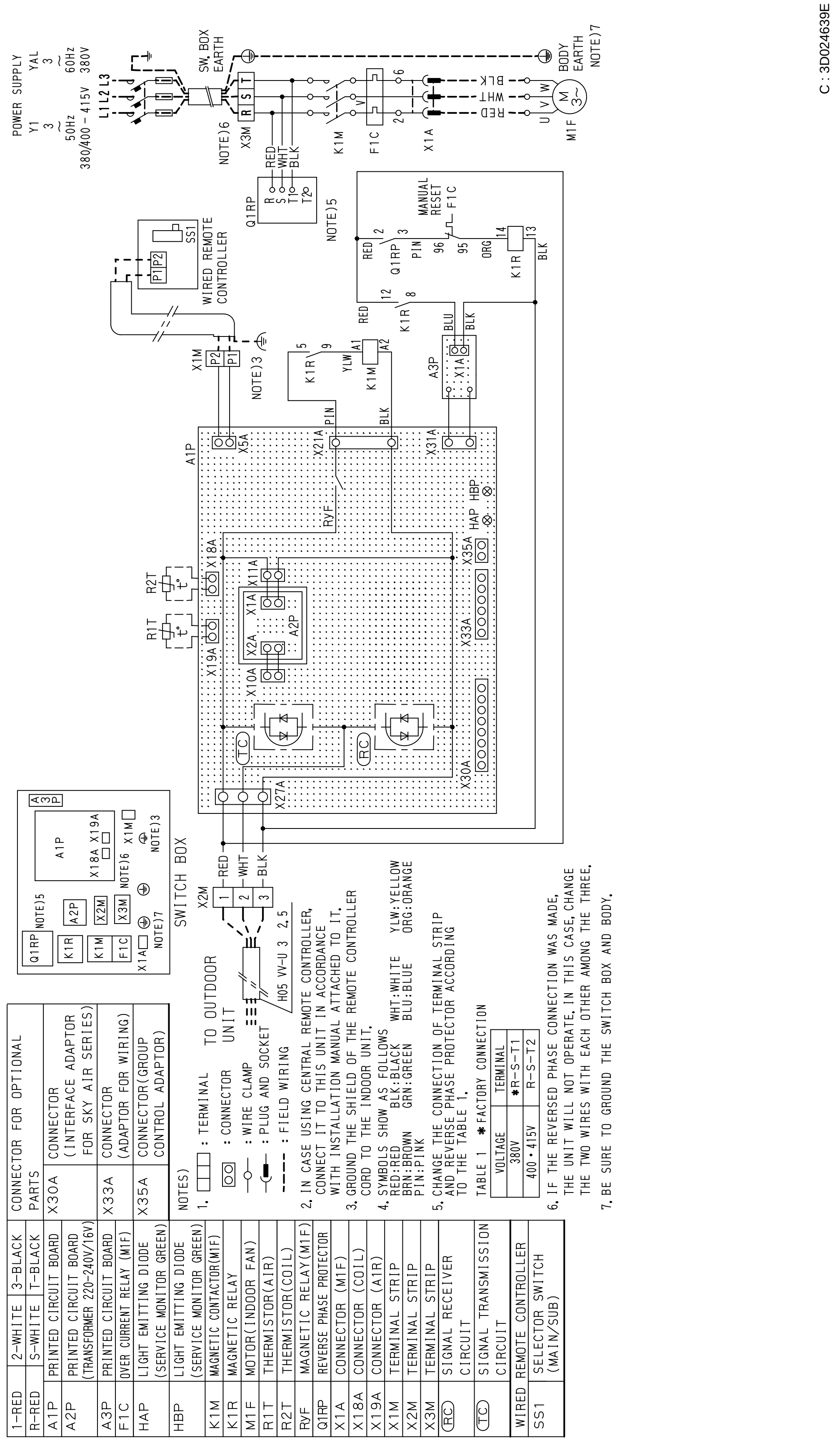


R-RED	S-WHITE	T-BLACK
11-RED	12-WHITE	13-BLACK
21-RED	22-WHITE	23-BLACK
A101P, A102P	PRINTED CIRCUIT BOARD	
A201P, A202P	PRINTED CIRCUIT BOARD (TRANSFORMER 220-240V/16V)	
A301P, A302P	PRINTED CIRCUIT BOARD	
F1C	OVER CURRENT RELAY (M1F)	
HAP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN)	
HBP	LIGHT EMITTING DIODE (SERVICE MONITOR-GREEN)	
K1M	MAGNETIC CONTACTOR(M1F)	
K1R, K2R	MAGNETIC RELAY	
R11T, R12T	THERMISTOR(AIR)	
R21T, R22T	THERMISTOR(COIL)	
RyF	MAGNETIC RELAY (M1F)	
Q1RP	REVERSE PHASE PROTECTOR	
X100A	CONNECTOR (M1F)	
X18A	CONNECTOR (COIL)	
X19A	CONNECTOR (AIR)	
X1M, X2M, X3M	TERMINAL STRIP	
RC	SIGNAL RECEIVER CIRCUIT	
TC	SIGNAL TRANSMISSION CIRCUIT	
WIRED REMOTE CONTROLLER		
SS1	SELECTOR SWITCH (MAIN/SUB)	
CONNECTOR FOR OPTIONAL PARTS		
X30A	CONNECTOR (INTERFACE ADAPTOR FOR SKY AIR SERIES)	
X33A	CONNECTOR (ADAPTOR FOR WIRING)	
X35A	CONNECTOR (GROUP CONTROL ADAPTOR)	

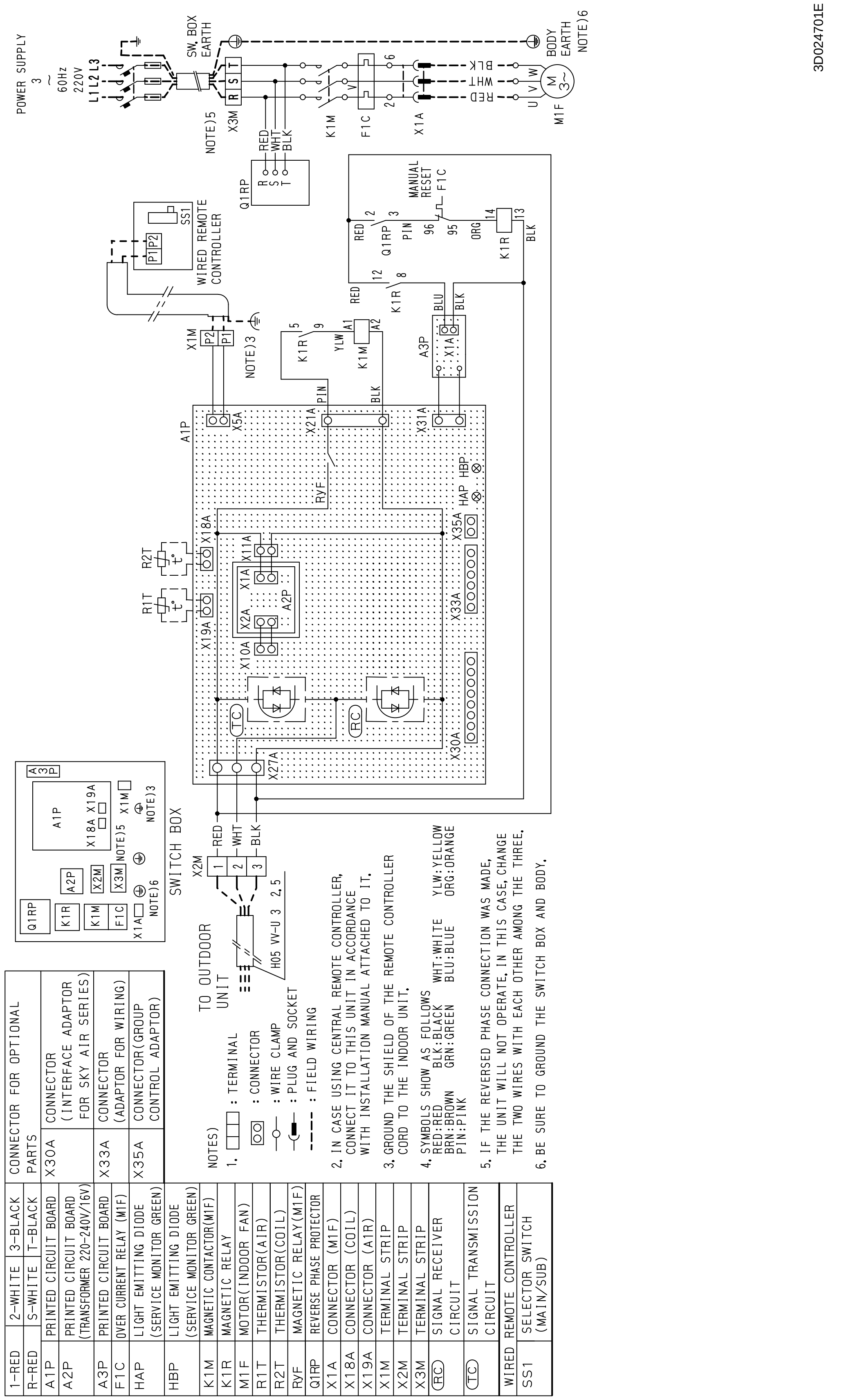
NOTES)
1. ☐☐☐ : TERMINAL　　○○ : CONNECTOR
   —○— : WIRE CLAMP　　—(▬— : PLUG AND SOCKET
   ---- : FIELD WIRING
2. IN CASE USING CENTRAL REMOTE CONTROLLER, CONNECT IT TO THIS UNIT IN ACCORDANCE WITH INSTALLATION MANUAL ATTACHED TO IT.
3. GROUND THE SHIELD OF THE REMOTE CONTROLLER CORD TO THE INDOOR UNIT.
4. SYMBOLS SHOW AS FOLLOWS
   RED:RED　BLK:BLACK　WHT:WHITE　YLW:YELLOW
   BLU:BLUE　ORG:ORANGE　PIN:PINK
5. IF THE REVERSED PHASE CONNECTION WAS MADE, THE UNIT WILL NOT OPERATE. IN THIS CASE, CHANGE THE TWO WIRES WITH EACH OTHER AMONG THE THREE.
6. BE SURE TO GROUND THE SWITCH BOX AND BODY.
7. [ ] SHOWS THE CASE OF FDY20KTAL MODEL.

2.2 Indoor Units FDY-KA Model

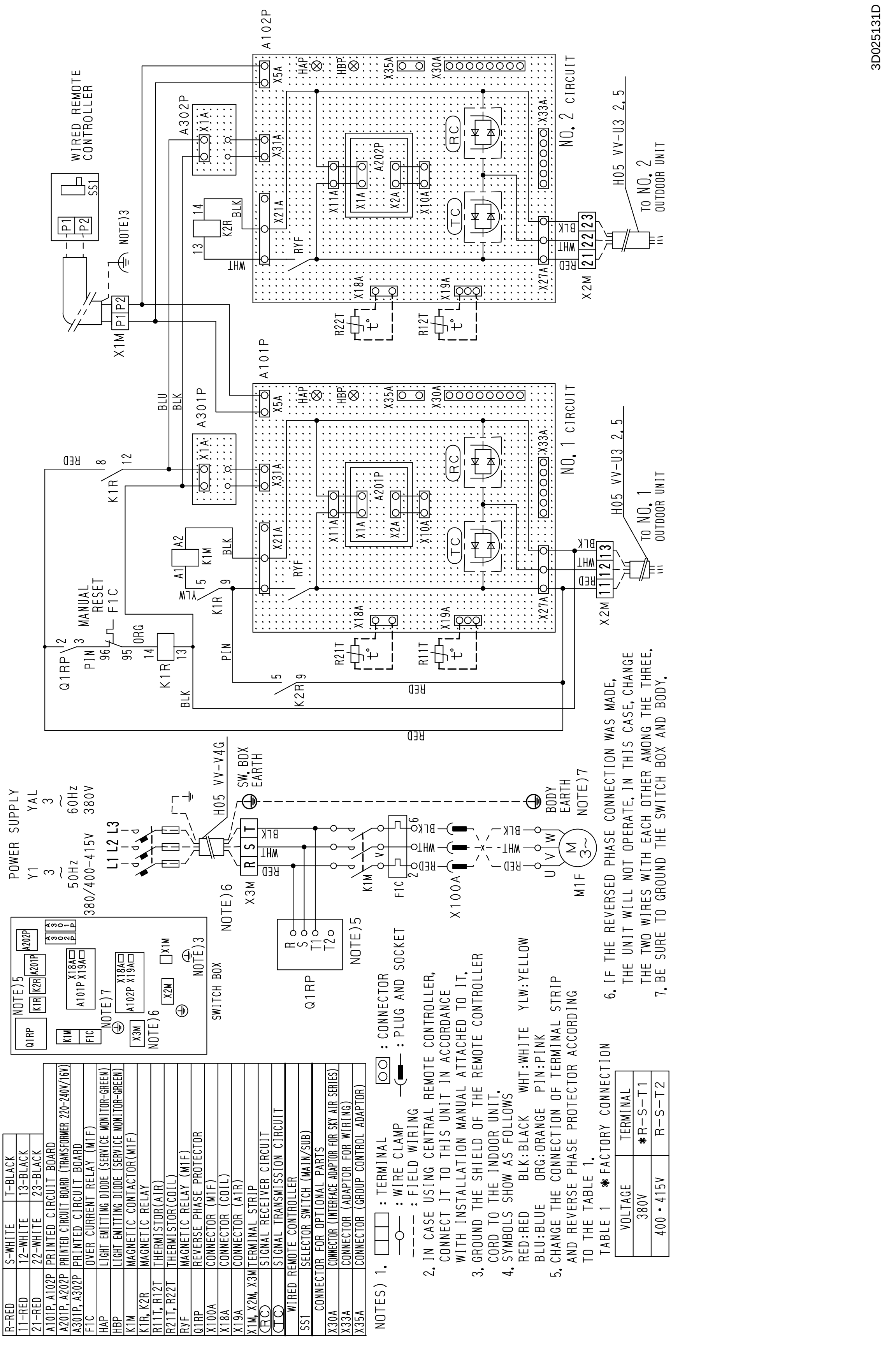
FDY06KAY1 / FDY08KAY1 / FDY10KAY1 / FDY08KAYAL / FDY10KAYAL



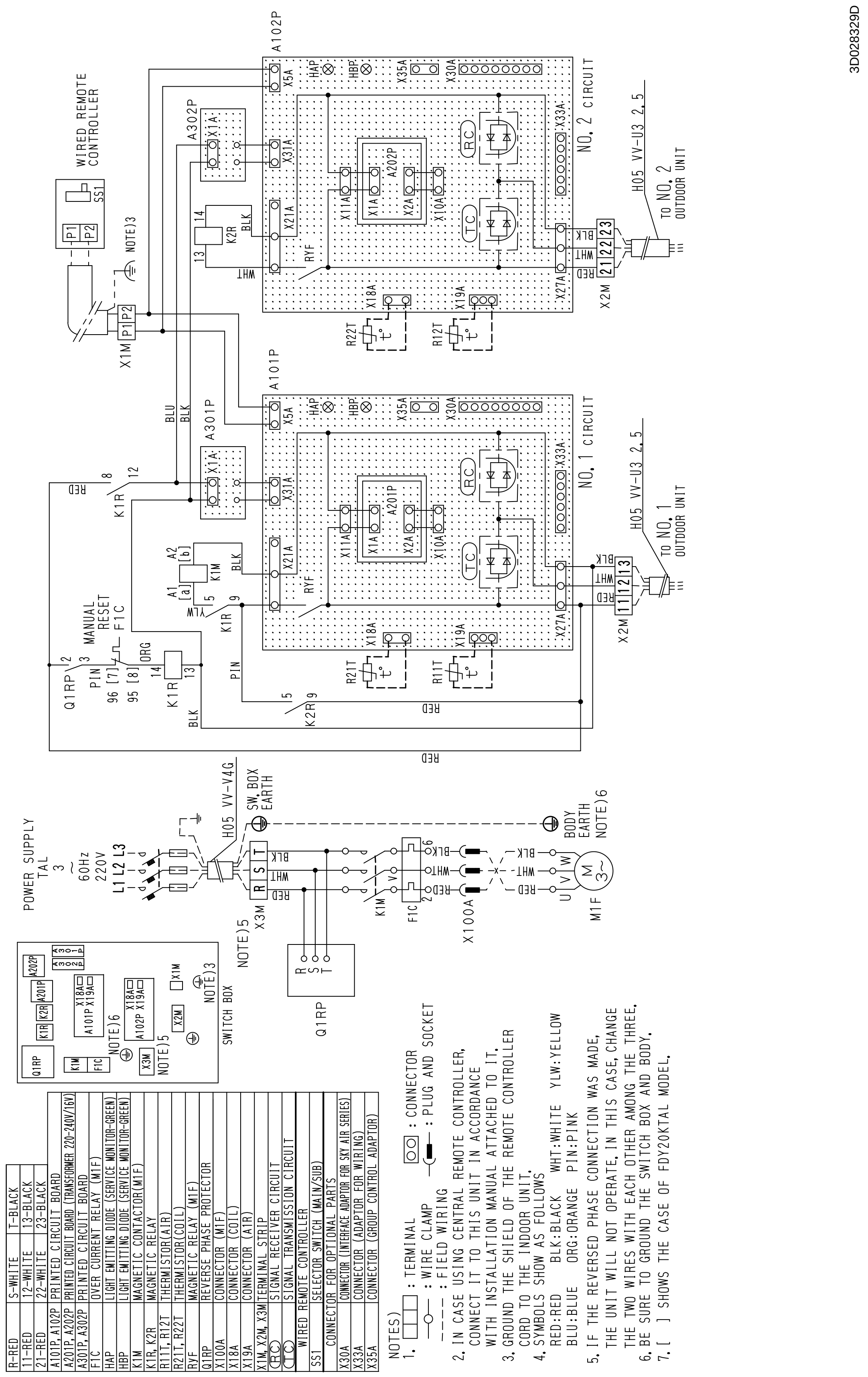
FDY08KATAL / FDY10KATAL



FDY15KAY1 / FDY20KAY1 / FDY15KAYAL / FDY20KAYAL

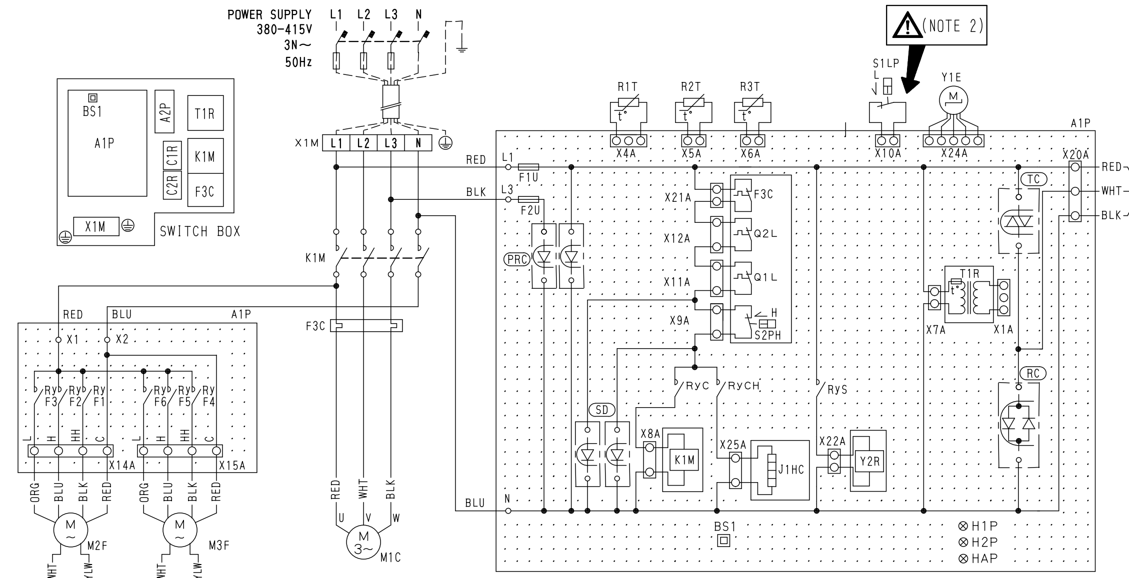


FDY15KATAL / FDY20KATAL



2.3 Outdoor Units

RY140KUY1

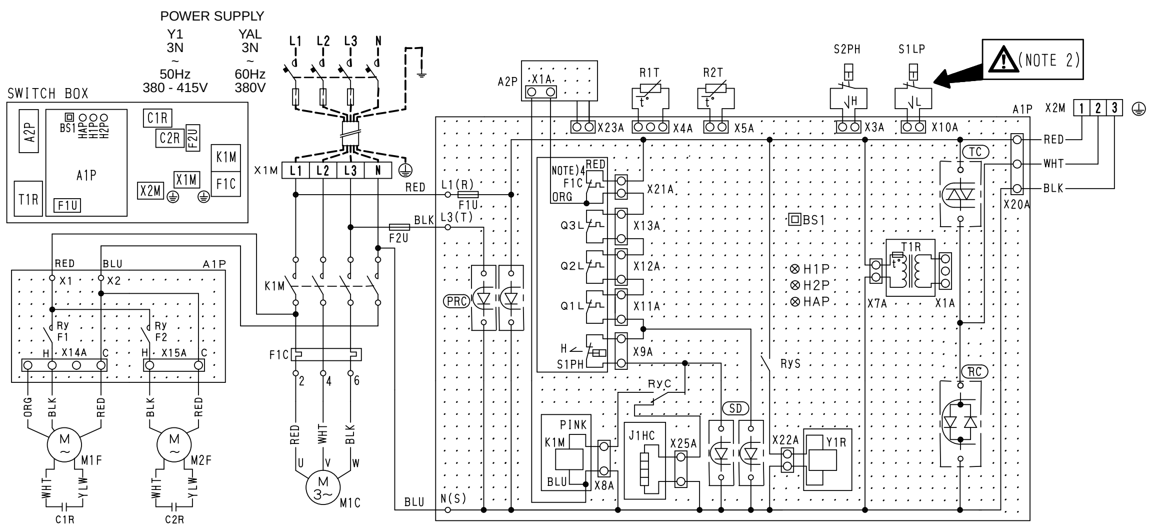


NOTES) 1. ☐☐☐☐ :TERMINAL, ⓄⓄ :CONNECTOR, -○- :WIRE CLAMP, ---- :FIELD WIRING
2. DO NOT OPERATE THE UNIT BY SHORT-CIRCUITING S1LP.
3. SYMBOLS SHOW AS FOLLOWS ; BLK:BLACK, RED:RED, ORG:ORANGE, BLU:BLUE, WHT:WHITE, YLW:YELLOW

L1-RED	L2-WHT L3-BLK N-BLU	HAP	LIGHT-EMITTING DIODE(SERVICE MONITOR-GREEN)	R2T	THERMISTOR(COIL)	X1M	TERMINAL STRIP
A1P	PRINTED CIRCUIT BOARD	H1P	LIGHT-EMITTING DIODE(SERVICE MONITOR-RED)	R3T	THERMISTOR(DISCHARGE PIPE)	Y1E	EXPANSION VALVE (ELECTRONIC TYPE)
A2P	PRINTED CIRCUIT BOARD	H2P	LIGHT-EMITTING DIODE(SERVICE MONITOR-RED)	RyC	MAGNETIC RELAY (K1M)	Y2R	4 WAY VALVE
BS1	PUSH BUTTON(FORCED DEF. • PUMP DOWN)	J1HC	CRANKCASE HEATER	RyCH	MAGNETIC RELAY (J1CH)	(PRC)	PHASE REVERSAL DETECT CIRCUIT
C1R•C2R	CAPACITOR (M2F • M3F)	K1M	MAGNETIC CONTACTOR (M1C)	RyF1•2•3•4•5•6	MAGNETIC RELAY (M2F • M3F)	(RC)	SIGNAL RECEIVER CIRCUIT
F1U•F2U	FUSE (250V, 6.3A)	M1C	MOTOR (COMPRESSOR)	RyS	MAGNETIC RELAY (Y2R)	(SD)	SAFETY DEVICES INPUT
F3C	OVER-CURRENT RELAY (M1C)	M2F•M3F	MOTOR (FAN)	S1LP	PRESSURE SWITCH (LOW)	(TC)	SIGNAL TRANSMISSION CIRCUIT
		Q1L•Q2L	THERMO SWITCH (M2F • M3F)	S2PH	PRESSURE SWITCH (HIGH)		
		R1T	THERMISTOR(AIR)	T1R	TRANSFORMER(220-240V/16V)		

C : 3D014604E

RY200KUY1 / RY200KUYAL

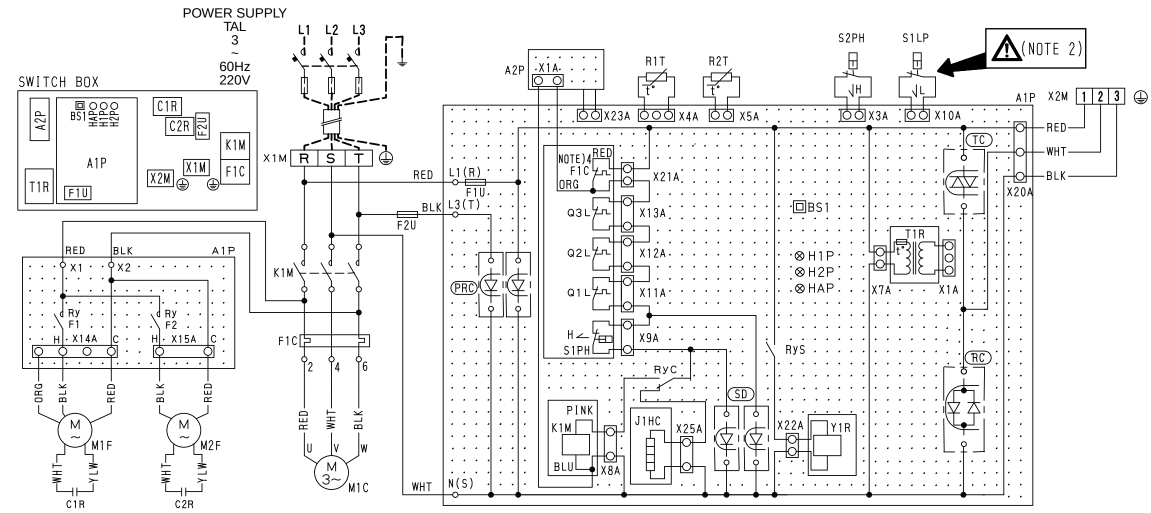


NOTES) 1. ☐☐☐☐ :TERMINAL, ⓄⓄ :CONNECTOR, -○- :WIRE CLAMP, ---- :FIELD WIRING
2. DO NOT OPERATE THE UNIT BY SHORT-CIRCUITING S1LP.
3. SYMBOLS SHOW AS FOLLOWS ; BLK:BLACK, RED:RED, ORG:ORANGE, BLU:BLUE, WHT:WHITE, YLW:YELLOW
4. THIS NORMALY CLOSED CONTACT IS MANUAL RESET TYPE.

L1-RED	L2-WHT L3-BLK N-BLU						
A1P	PRINTED CIRCUIT BOARD						
A2P	PRINTED CIRCUIT BOARD						
BS1	PUSH BUTTON(FORCED DEF. • PUMP DOWN)						
C1R•C2R	CAPACITOR (M1F • M2F)	M1C	MOTOR (COMPRESSOR)	RyF1•2	MAGNETIC RELAY (M1F • M2F)	X2M	TERMINAL STRIP
F1C	OVER-CURRENT RELAY (M1C)	M1F•M2F	MOTOR (FAN)	RyS	MAGNETIC RELAY (Y1R)	Y1R	4 WAY VALVE
F1U•F2U	FUSE (250V, 10A)	Q1L•Q2L •Q3L	THERMO SWITCH (M1F • M2F • M1C)	S1LP	PRESSURE SWITCH (LOW)	(PRC)	PHASE REVERSAL DETECT CIRCUIT
HAP	LIGHT-EMITTING DIODE(SERVICE MONITOR-GREEN)			S1PH	PRESSURE SWITCH (HIGH)	(RC)	SIGNAL RECEIVER CIRCUIT
H1P•H2P	LIGHT-EMITTING DIODE(SERVICE MONITOR-RED)	R1T	THERMISTOR(AIR)	S2PH	PRESSURE SWITCH (HIGH CONTROL)	(SD)	SAFETY DEVICES INPUT
J1HC	CRANKCASE HEATER	R2T	THERMISTOR(COIL)	T1R	TRANSFORMER(220-240V/16V)	(TC)	SIGNAL TRANSMISSION CIRCUIT
K1M	MAGNETIC CONTACTOR (M1C)	RyC	MAGNETIC RELAY	X1M	TERMINAL STRIP		

C : 3D028900

RY200KUTAL

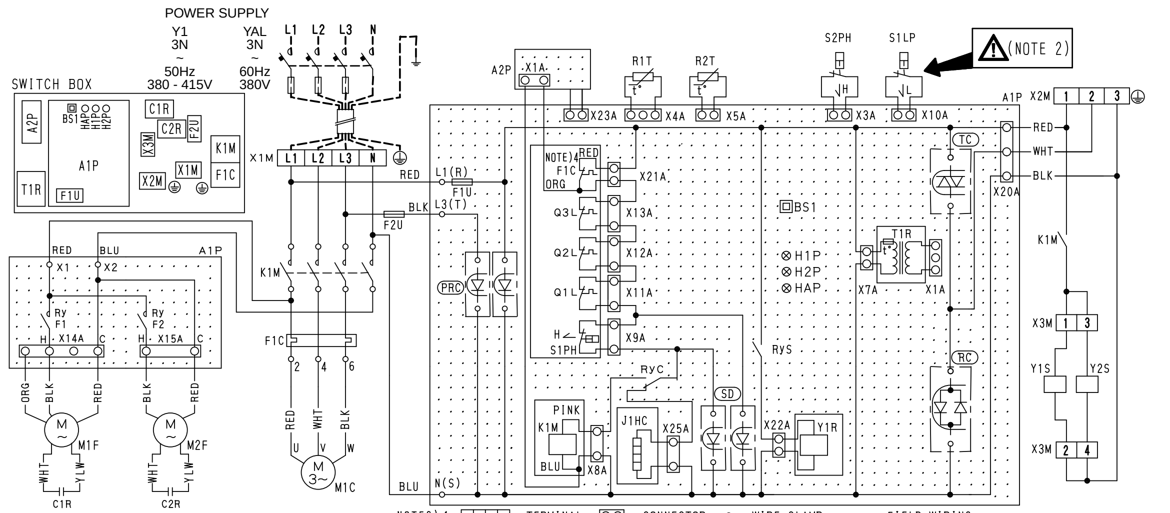


NOTES) 1. ▭▭▭▭ :TERMINAL, ◎◎ :CONNECTOR, -○- :WIRE CLAMP, ---- :FIELD WIRING
2. DO NOT OPERATE THE UNIT BY SHORT-CIRCUITING S1LP.
3. SYMBOLS SHOW AS FOLLOWS ; BLK:BLACK, RED:RED, ORG:ORANGE, BLU:BLUE, WHT:WHITE, YLW:YELLOW
4. THIS NORMALY CLOSED CONTACT IS MANUAL RESET TYPE.

R-RED	S-WHT	T-BLK					
A1P	PRINTED CIRCUIT BOARD						
A2P	PRINTED CIRCUIT BOARD						
BS1	PUSH BUTTON(FORCED DEF. • PUMP DOWN)						
C1R•C2R	CAPACITOR (M1F • M2F)	M1C	MOTOR (COMPRESSOR)	RyF1•2	MAGNETIC RELAY (M1F • M2F)	X2M	TERMINAL STRIP
F1C	OVER-CURRENT RELAY (M1C)	M1F•M2F	MOTOR (FAN)	RyS	MAGNETIC RELAY (Y1R)	Y1R	4 WAY VALVE
F1U•F2U	FUSE (250V, 10A)	Q1L•Q2L	THERMO SWITCH	S1LP	PRESSURE SWITCH (LOW)	PRC	PHASE REVERSAL DETECT CIRCUIT
HAP	LIGHT-EMITTING DIODE(SERVICE MONITOR-GREEN)	•Q3L	(M1F • M2F • M1C)	S1PH	PRESSURE SWITCH (HIGH)	RC	SIGNAL RECEIVER CIRCUIT
H1P•H2P	LIGHT-EMITTING DIODE(SERVICE MONITOR-RED)	R1T	THERMISTOR(AIR)	S2PH	PRESSURE SWITCH (HIGH CONTROL)	SD	SAFETY DEVICES INPUT
J1HC	CRANKCASE HEATER	R2T	THERMISTOR(COIL)	T1R	TRANSFORMER(220-240V/16V)	TC	SIGNAL TRANSMISSION CIRCUIT
K1M	MAGNETIC CONTACTOR (M1C)	RyC	MAGNETIC RELAY	X1M	TERMINAL STRIP		

C : 3D028902

RY250KUY1 / RY250KUYAL

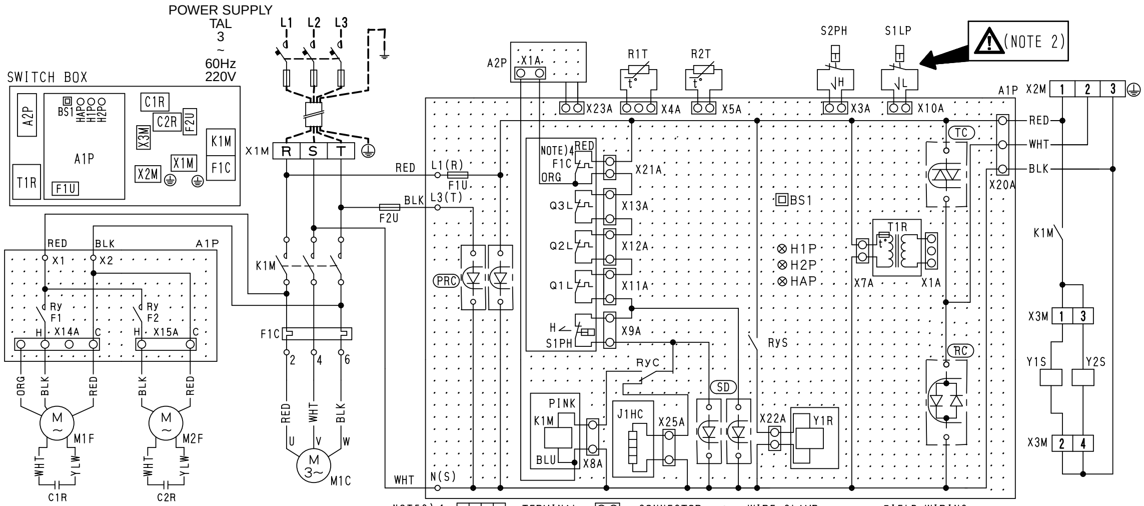


NOTES) 1. ▭▭▭▭ :TERMINAL, ◎◎ :CONNECTOR, -○- :WIRE CLAMP, ---- :FIELD WIRING
2. DO NOT OPERATE THE UNIT BY SHORT-CIRCUITING S1LP.
3. SYMBOLS SHOW AS FOLLOWS ; BLK:BLACK, RED:RED, ORG:ORANGE, BLU:BLUE, WHT:WHITE, YLW:YELLOW
4. THIS NORMALY CLOSED CONTACT IS MANUAL RESET TYPE.

L1-RED	L2-WHT	L3-BLK	N-BLU				
A1P	PRINTED CIRCUIT BOARD						
A2P	PRINTED CIRCUIT BOARD						
BS1	PUSH BUTTON(FORCED DEF. • PUMP DOWN)	M1C	MOTOR (COMPRESSOR)	RyS	MAGNETIC RELAY (Y1R)	Y1R	4 WAY VALVE
C1R•C2R	CAPACITOR (M1F • M2F)	M1F•M2F	MOTOR (FAN)	S1LP	PRESSURE SWITCH (LOW)	Y1S	SOLENOID VALVE
F1C	OVER-CURRENT RELAY (M1C)	Q1L•Q2L	THERMO SWITCH	S1PH	PRESSURE SWITCH (HIGH)	Y2S	
F1U•F2U	FUSE (250V, 10A)	•Q3L	(M1F • M2F • M1C)	S2PH	PRESSURE SWITCH (HIGH CONTROL)	PRC	PHASE REVERSAL DETECT CIRCUIT
HAP	LIGHT-EMITTING DIODE(SERVICE MONITOR-GREEN)	R1T	THERMISTOR(AIR)	T1R	TRANSFORMER(220-240V/16V)	RC	SIGNAL RECEIVER CIRCUIT
H1P•H2P	LIGHT-EMITTING DIODE(SERVICE MONITOR-RED)	R2T	THERMISTOR(COIL)	X1M	TERMINAL STRIP	SD	SAFETY DEVICES INPUT
J1HC	CRANKCASE HEATER	RyC	MAGNETIC RELAY	X2M	TERMINAL STRIP	TC	SIGNAL TRANSMISSION CIRCUIT
K1M	MAGNETIC CONTACTOR (M1C)	RyF1•2	MAGNETIC RELAY (M1F • M2F)	X3M	TERMINAL STRIP		

C : 3D028901

RY250KUTAL



NOTES) 1. [terminal symbol] :TERMINAL, [connector symbol] :CONNECTOR, -o- :WIRE CLAMP, ---- :FIELD WIRING

2. DO NOT OPERATE THE UNIT BY SHORT-CIRCUITING S1LP.

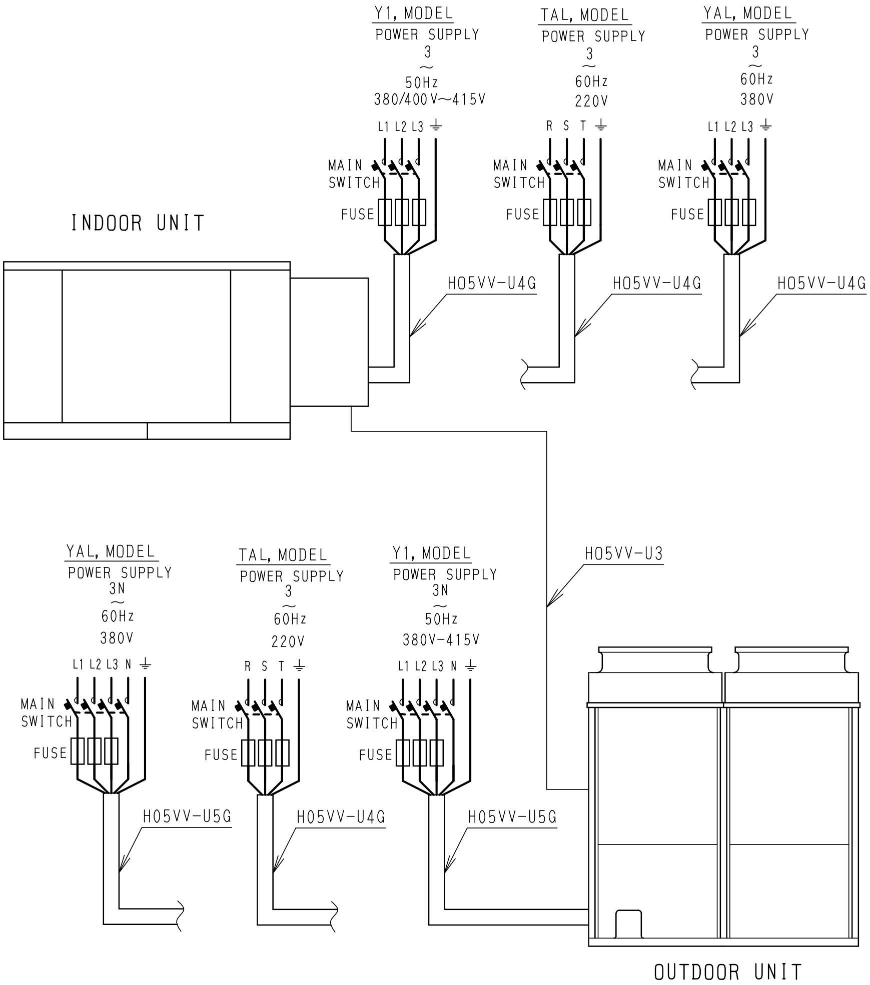
3. SYMBOLS SHOW AS FOLLOWS ; BLK:BLACK, RED:RED, ORG:ORANGE, BLU:BLUE, WHT:WHITE, YLW:YELLOW

4. THIS NORMALY CLOSED CONTACT IS MANUAL RESET TYPE.

R-RED	S-WHT T-BLK						
A1P	PRINTED CIRCUIT BOARD						
A2P	PRINTED CIRCUIT BOARD						
BS1	PUSH BUTTON(FORCED DEF. • PUMP DOWN)	M1C	MOTOR (COMPRESSOR)	RyS	MAGNETIC RELAY (Y1R)	Y1R	4 WAY VALVE
C1R•C2R	CAPACITOR (M1F • M2F)	M1F•M2F	MOTOR (FAN)	S1LP	PRESSURE SWITCH (LOW)	Y1S	SOLENOID VALVE
F1C	OVER-CURRENT RELAY (M1C)	Q1L•Q2L	THERMO SWITCH	S1PH	PRESSURE SWITCH (HIGH)	Y2S	
F1U•F2U	FUSE (250V, 10A)	•Q3L	(M1F • M2F • M1C)	S2PH	PRESSURE SWITCH (HIGH CONTROL)	PRC	PHASE REVERSAL DETECT CIRCUIT
HAP	LIGHT-EMITTING DIODE(SERVICE MONITOR-GREEN)	R1T	THERMISTOR(AIR)	T1R	TRANSFORMER(220-240V/16V)	RC	SIGNAL RECEIVER CIRCUIT
H1P•H2P	LIGHT-EMITTING DIODE(SERVICE MONITOR-RED)	R2T	THERMISTOR(COIL)	X1M	TERMINAL STRIP	SD	SAFETY DEVICES INPUT
J1HC	CRANKCASE HEATER	RyC	MAGNETIC RELAY	X2M	TERMINAL STRIP	TC	SIGNAL TRANSMISSION CIRCUIT
K1M	MAGNETIC CONTACTOR (M1C)	RyF1•2	MAGNETIC RELAY (M1F • M2F)	X3M	TERMINAL STRIP		

C : 3D028903

2.4 Field Wiring (FDY06 / 08 / 10K(A))

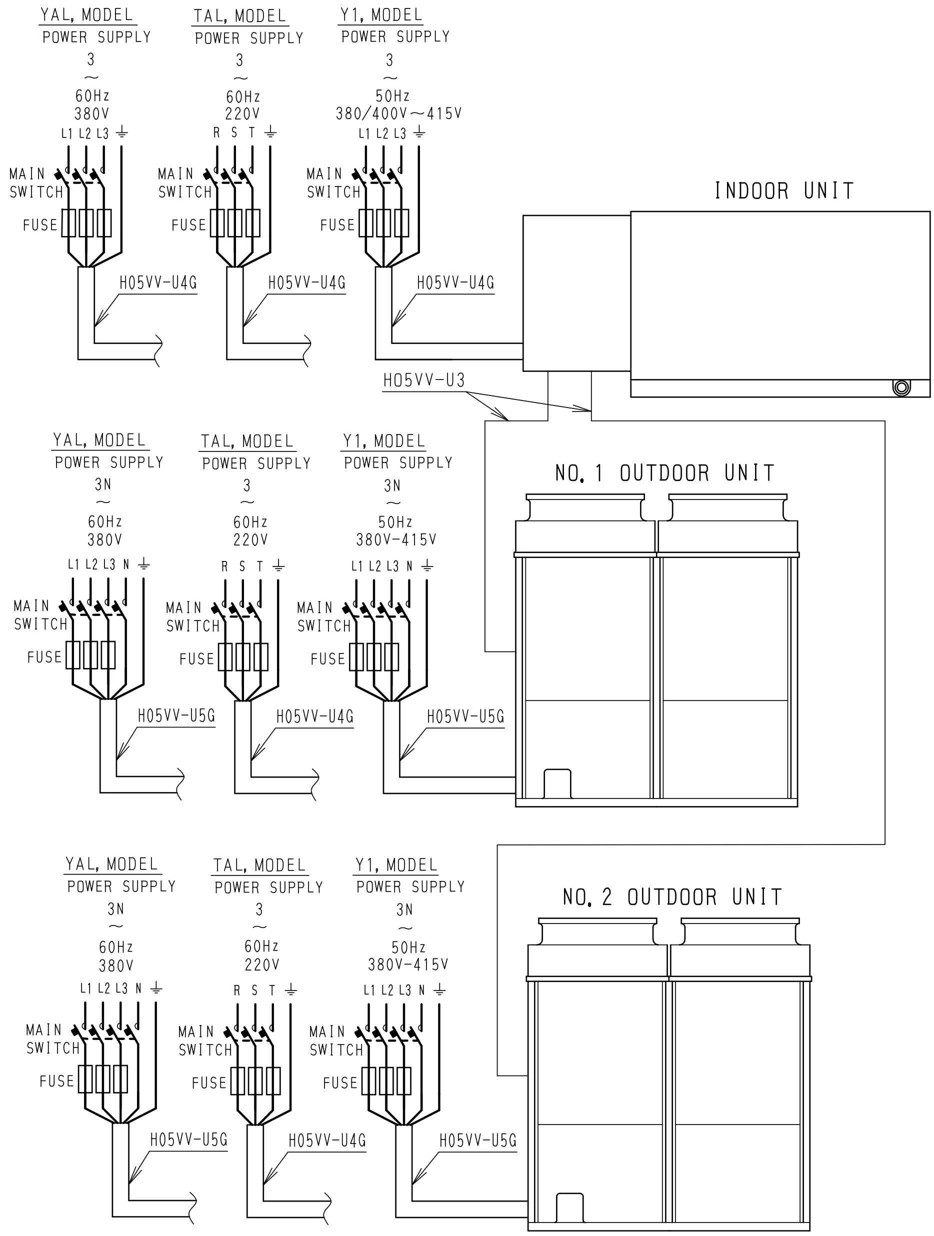


Notes

1) —— Line voltage wiring
—— Control circuit wiring
2) All wiring, components and materials to be procured on the site must comply with the applicable local and national codes.
3) Use copper conductors only.
4) As for details, see wiring diagrams.
5) Install fuse and mainswitch for safety.
6) All field wiring and components must be provided by a licensed electrician.
7) Unit shall be grounded in compliance with the applicable local and national codes.
8) Wiring shown are general points-of-connection guides only and are not intended for or to include all details for a specific installation.
9) The outdoor units and indoor units for 3 phase, are equipped with a reverse phase protector to protect the compressor and the fan motor. If the compressor or the fan motor does not operate during the test run, exchange two phase connections out of three.
10) Never share a common power source with other equipment.
11) Never share a common power source for both indoor and outdoor units.
12) The illustration of OUTDOOR UNIT shown here indicates RY250KU MODEL.

C : 3D029781

2.5 Field Wiring (FDY15 / 20K(A))



Notes

1) ━━ Line voltage wiring
—— Control circuit wiring
2) All wiring, components and materials to be procured on the site must comply with the applicable local and national codes.
3) Use copper conductors only.
4) As for details, see wiring diagrams.
5) Install fuse and mainswitch for safety.
6) All field wiring and components must be provided by a licensed electrician.
7) Unit shall be grounded in compliance with the applicable local and national codes.
8) Wiring shown are general points-of-connection guides only and are not intended for or to include all details for a specific installation.
9) The outdoor units and indoor units for 3 phase, are equipped with a reverse phase protector to protect the compressor and the fan motor. If the compressor or the fan motor does not operate during the test run, exchange two phase connections out of three.
10) Never share a common power source with other equipment.
11) Never share a common power source for both indoor and outdoor units.
12) The illustration of OUTDOOR UNIT shown here indicates RY250KU MODEL.

3D031550

Index

Drawings & Flow Charts

DAIKIN INDUSTRIES, LTD.
Head office:
Umeda Center Bldg., 4-12, Nakazaki-Nishi 2-chome,
Kita-ku, Osaka, 530-8323 Japan

Tokyo office:
Shinjuku Sumitomo Bldg., 6-1 Nishi-Shinjuku
2-chome, Shinjuku-ku, Tokyo, 163-0235 Japan

DAIKIN EUROPE NV
Zandvoordestraat 300, B-8400 Oostende, Belgium

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